THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXXVI. No. 913.] LONDON, NOVEMBER 9, 1880. [32ND YEAR. Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

COOKE BROS.,
CENTRAL DEPÔTS:
CO. DONEGAL, IRELAND;
LONDON DEPÔT:
ERITH,
OFFICES:
2, CROSBY SQUARE,
LONDON, E.C.

GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
SEVERAL PRIZE MEDALS. ESTABLISHED OVER 20 YEARS.
These Paints are now used by all the London Gas Companies and most of the principal Country Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
Supplied, mixed ready for use, or in paste, as desired.
TORBAY PAINT COMPANY.
PROPRIETORS: STEVENS & CO.,
21, GREAT WINCHESTER STREET, LONDON.
WORKS: BRIXHAM, TORBAY.

TUBES.
FIRST PRIZE SYDNEY EXHIBITION 1880
Tubes and Fittings for Gas, Steam, Water, and Hydraulic purposes, plain, galvanized, white enamelled inside, or coated by Dr. Angus Smith's process, or oxidized by Prof. Barff's patent process. Gas-fitters tools, brass cocks, &c.
JOHN SPENCER,
VULCAN TUBE WORKS,
WEST BROMWICH, STAFFORDSHIRE,
& 97, CANNON ST., LONDON.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
JOS. COWEN & CO. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL & CO.,
LIMITED,
Established at the commencement of Gas Lighting,
MANUFACTURERS OF
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
HEAD LONDON OFFICE:
145, QUEEN VICTORIA STREET.
ALMA TUBE-WORKS, WALSALL;
OLD PATENT TUBE-WORKS, WEDNESBURY.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
LICENSEES AND MANUFACTURERS OF
HUNTS
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
ESTABLISHED 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
London Offices: 97, CANNON STREET—
JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE,
From ½ to 40 H.P. ind.
See Page 718.
CROSSLEY BROTHERS,
MANCHESTER AND LONDON.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.
ESTABLISHED 1840.

GEORGE GLOVER AND CO.,
PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
AND MANUFACTURERS OF
IMPROVED DRY GAS-METERS.
GOLD MEDAL. HIGHEST AWARD.

INTERNATIONAL EXHIBITION,
SYDNEY, 1880.
RANELAGH WORKS, ROYAL AVENUE, CHELSEA, LONDON, S.W.
1, LANCASTER AVENUE, MANCHESTER.
Foreign Agents: DAHL BROS., Copenhagen; A. FAAS & CO., Frankfort-on-Maine; W. HOVEN & SON, Rotterdam; COPLAND & M'LAREN, Montreal
A. DEMPSTER, 57, Elizabeth Street, Melbourne.

WELLINGTON TUBE WORKS,

GREAT BRIDGE, TIPTON, STAFFORDSHIRE.

JOSEPH AIRD,

GAS, STEAM, AND HYDRAULIC TUBES AND FITTINGS.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),

MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST-IRON TANKS FOR DITTO.

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS.

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

Drawings, Specifications, and Estimates supplied on application.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS,

ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

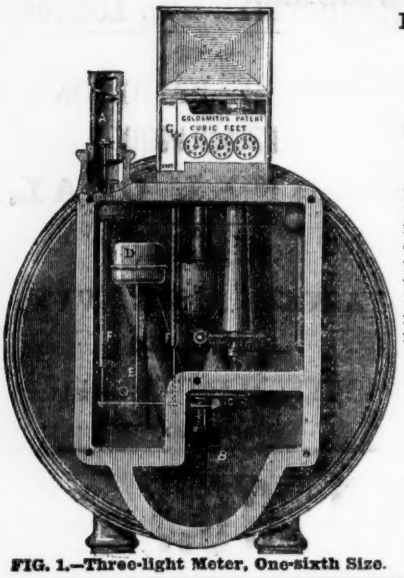


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

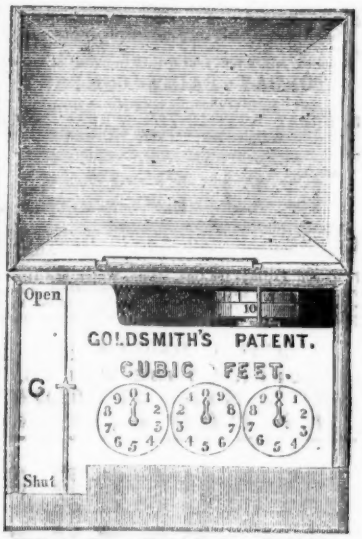


FIG. 2.—Three-light Index, Half Size.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.,

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

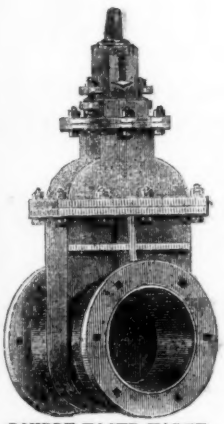
By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

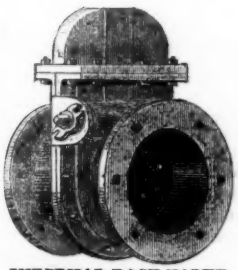
Drawings, Specifications, and Estimates supplied on application.

LONDON OFFICES: 97, CANNON STREET—JAMES E. & SAMUEL SPENCER, AGENTS.

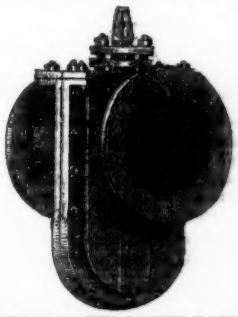
C. & W. WALKERS' GAS-VALVES.



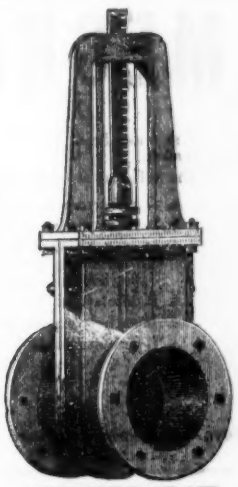
DOUBLE-FACED VALVE SPECIALLY FOR PURIFIERS.



INTERNAL RACK-VALVE WITH STEEL PINION, FOR GENERAL USE.



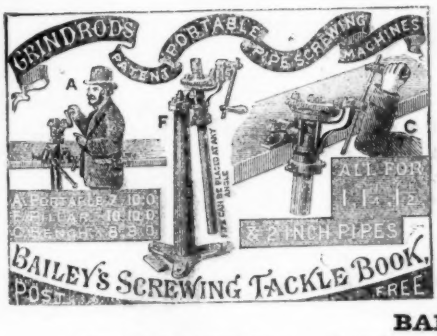
UNDERGROUND SCREW-VALVE FOR SHALLOW STREET-MAINS.



ORDINARY RACK AND PINION VALVE.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.



BAILEY'S FLY WHEEL STEAM PUMPS
SIMPLE & STRONG
WITH NO MYSTERIOUS VALVES.
W. H. BAILEY & Co. HYDRAULIC ENGINEERS.
ALBION WORKS, SALFORD, MANCHESTER.

Prices of Bailey's Double-Acting Steam-Pumps.

No.	Diameter of Steam Cylinder.	Diameter of Pump.	Length of Stroke.	Gallons pr. Hour. Approx.	Price.
	Inches.	Inches.	Inches.	At Slow Speed.	£
A 1	4	2	6	850	18
B 2	6	3	10	1,940	25
C 3	6	4	10	2,000	30
D 4	8	4	10	3,150	40
E 5	6	6	10	7,200	40
F 6	8	6	10	7,200	50
G 7	10	6	12	7,200	60
H 8	8	8	10	14,000	65
I 9	10	8	12	14,000	75
K 10	12	8	15	14,000	90
	10	10	15	21,000	110
	12	10	15	21,000	125

NOTE.—*At quick speed these pumps will generally deliver double the quantity specified.*

BAILEY'S HOT-AIR ENGINES,

From ¼-horse to 4-horse Power. Particulars on application. We also make Hot-Air Pumping Engines, and every description of Hydraulic Work.

W. H. BAILEY & CO., ALBION WORKS, SALFORD, MANCHESTER.

ROBT. DEMPSTER & SONS,

GAS ENGINEERS, IRONFOUNDERS, AND CONTRACTORS,

ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS;

CONTRACTORS FOR THE

ERECTION OF PUBLIC AND PRIVATE GAS-WORKS.

Plans and Specifications Prepared, and Illustrated Catalogues forwarded on application.

GAS PURIFICATION

BY

OXIDE OF IRON.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

GAS *v.* ELECTRIC LIGHT.

WIGHAM'S PATENT LIGHTHOUSE GAS-BURNERS,

For Street Lighting and the Illumination of Large Halls, Factories, Ship Yards, &c., where Powerful Light is required

These Burners have been adopted by a School Board, having large school-rooms in charge, because of their high illuminating power and the facilities they give for perfect ventilation. The actinic power of these Burners is such that they are used successfully for Photography and Photo-Lithography.

SOLE MANUFACTURERS:

J. EDMUNDSON & CO., Gas Engineers, 19, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

MECHANICAL CONDENSATION.

The undersigned has arranged with Messrs. Pelouze and Audouin the exclusive agency for their patented system of Condensation, in Great Britain and the Colonies.

The following are some of the advantages which this philosophic mode of arresting liquefiable vapours possesses:—

1. It acts irrespective of temperature.
2. It requires no motive power, but automatically adapts itself to production.
3. It may be fixed directly after the hydraulic main, by which prolonged contact of the gas with tar is avoided, and the highest standard of illuminating power is obtained which the coal is capable of giving; or it may be fixed directly after an ordinary air condenser, when it will arrest the vapoury globules which cooling alone will not stop, and the production of tar and ammonia water is thereby increased.
4. It effects a considerable saving in purification, through no tar getting to the material to clog its action.
5. It entirely supersedes the necessity of scrubbers; and if wet sawdust be used in a purifier, washers also are unnecessary.
6. It occupies but little space, and avoids that which is now considered a disadvantage—the too much cooling, scrubbing, and washing of gas.

Further particulars may be obtained of

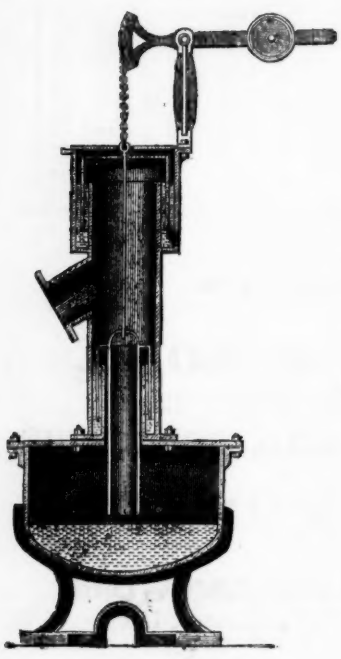
GEO. BOWER, St. Neots, Hunts.

NOTE.—*Gas-works contracted for complete, or apparatus supplied in detail from the retort to the burner.* "*The Gas and Water Engineer's Book of Reference,*" *post free,* 5s. "*Handy Abstract of the Public Health Act,* 1875," *post free,* 1s.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



The following Testimonials, as to five years constant working of this Patent Removable Dip, have been received:—

Metropolitan District Asylum Gas-Works,
Caterham, Surrey, Jan. 15, 1874.

Messrs. CHANDLER and SONS.

DEAR SIRS,

In reply to your inquiries, I beg to inform you that since I have used your Patented Dips (ten in number), I find my make has increased over 1000 cubic feet per ton of coal carbonized, my usual make being 9070 cubic feet before using your Dips, and 10,150 cubic feet since using them.

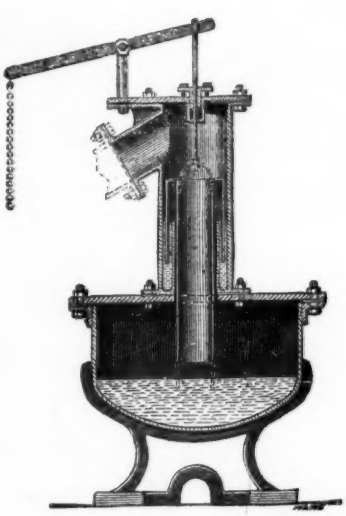
Metropolitan District Asylum Gas-Works,
Caterham, Surrey, Dec. 30, 1879.

Messrs. CHANDLER and SONS.

DEAR SIRS,

In reply to your inquiry, it is with very much pleasure thatI endorse every word of my letter of Jan. 15, 1874; and I may add that from the date the Patent Dips were fitted, they have worked perfectly, and there is very little carbon deposited in the retorts, in consequence of the lower pressure.

Yours faithfully,
(Signed) W. CRICKMAY,
Memb. Soc. Engineers.



APPLICATIONS TO BE MADE TO

Messrs. CHANDLER & SONS,

104, NEWINGTON CAUSEWAY, S.E.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

PATENT "STANDARD" WASHER-SCRUBBER,

FOR

GAS PURIFICATION,

TAKES OUT EVERY TRACE OF AMMONIA AND A LARGE QUANTITY OF CARBONIC ACID AND SULPHURETTED HYDROGEN BY ONCE PASSING THROUGH THE MACHINE.

AMMONIACAL LIQUOR OBTAINED OF ANY REQUIRED STRENGTH.

The Cost of the Machine defrayed by the Ammonia obtained in Twelve Months. It requires very little attention, and cannot get out of order.

These Machines, which contain from 3200 feet to 65,000 feet of Wetted Surface, are supplied to the following Gas-Works:—

	Feet per Day.		Feet per Day.		Feet per Day.
The Gaslight Company—		Leeds Corporation. . . .	14,000,000	West Bromwich Improvement	
Beckton.	7,500,000	Leominster Company . . .	150,000	Commissioners	1,000,000
Bromley.	7,000,000	Maidstone Company . . .	1,000,000	Radcliffe and Pilkington Co. .	750,000
St. Pancras	3,000,000	South Metropolitan Company,		Falmouth Company . . .	150,000
Shoreditch	2,500,000	Greenwich	2,500,000	European Company, Rouen .	250,000
Bradford Corporation . . .	1,000,000	Ditto, Vauxhall	3,000,000	Deal Company.	200,000
Bremen Company, Germany .	150,000	Woolwich Equitable Company.	400,000	Leyden Company, Holland .	560,000
Dukinfield Local Board . .	500,000	Yeadon Company	500,000	Kingston-upon-Hull Company.	400,000
Driffield Company. . . .	100,000	Salford Corporation . . .	5,250,000	Ilkeston Local Board . . .	250,000
Goole Company	250,000	London Gas Co., Nine Elms .	3,000,000	Dover Company	750,000
Glossop Company	300,000	Nottingham Corporation . .	1,250,000	Frankfort Company . . .	300,000
Holywood Company, Ireland .	125,000	Cheltenham Company . . .	2,000,000	Huy, Belgium	70,000
Heywood Local Board . .	600,000				

Washers in course of Construction—

	Feet per Day.		Feet per Day.		Feet per Day.
Yeovil Company	250,000	Oldbury Local Board . . .	500,000	Newport, U.S.A.	250,000
S. Metropolitan Co., Vauxhall.	3,000,000	Altrincham Company . . .	600,000	Ramsgate Local Board . .	1,000,000
Derby Company	1,500,000	Cannes, France	200,000	Sydney Company	1,000,000

TESTIMONIALS.

Messrs. Kirkham and Hersey. *The Gaslight and Coke Company, Beckton, North Woolwich, June* 8, 1880.

Gentlemen,—I enclose you some particulars of the working of your Washers here, and I intend having some more experiments made, as just now we are working the first Washer with liquor, and the second with water. Of course the fact of our having ordered two more in addition to the four which we have in use is a sufficient indication of my opinion of the value of the Washer. (Signed) G. C. TREWBY.

Messrs. Kirkham and Hersey. *South Metropolitan (late Phœnix) Gaslight Company, Engineer's Office, June* 19, 1880.

Dear Sirs,—The "Standard" Washer which you supplied for use at our Vauxhall station has afforded me entire satisfaction. It was designed to remove the ammonia from 3 million cubic feet of gas per day, and during the past winter it did so with a good working margin to spare. It is as excellent now in workmanship as in design, and is well worthy of the general acceptance with which it appears to be meeting.

I am, faithfully yours, (Signed) CORBET WOODALL.

Messrs. Kirkham and Hersey. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Aug.* 12, 1879.

Gentlemen,—In reply to your inquiry, one of your Patent Scrubber-Washers to purify 100,000 cubic feet per hour was put into operation at these works on the 1st of June. At the same moment the whole of our Scrubbers, equal to 28,000 cubic feet, were thrown out of use, leaving your Washer the whole work of freeing the gas from Ammonia. This it has done to perfection up to date. With 10 gallons of water to each ton of coal carbonized passing through it we get a clean test at the seventh chamber, leaving four chambers margin for extra work. The mean quantity of Ammonia in the inlet (fixed and free), obtained from a large number of tests, was 241 grains per 100 feet of gas. On the outlet—Free Ammonia—Nil. The quantity of water used is 10 gallons per ton of coal carbonized. The strength of liquor as follows:—

Chamber No.	1	2	3	4	5	6	7	8	9	10	11
Strength of liquor—ounces .	Nil.	Nil.	Nil.	Nil.	0·4	1·0	2·2	3·5	5·5	8·25	12·5

We are working five revolutions per minute. It takes out all the free Ammonia, reduces the carbonic acid and sulphuretted hydrogen 30 per cent., requires a very small amount of power to drive, and altogether is, in my opinion, the best machine for the purpose yet invented, and will, I feel confident, ere long, entirely supersede the Scrubbers of to-day. I am glad to find you are going to fix one of these Washers at our Vauxhall works.

(Signed) P. J. WATES, Engineer.

For other Testimonials, see next week's Journal.

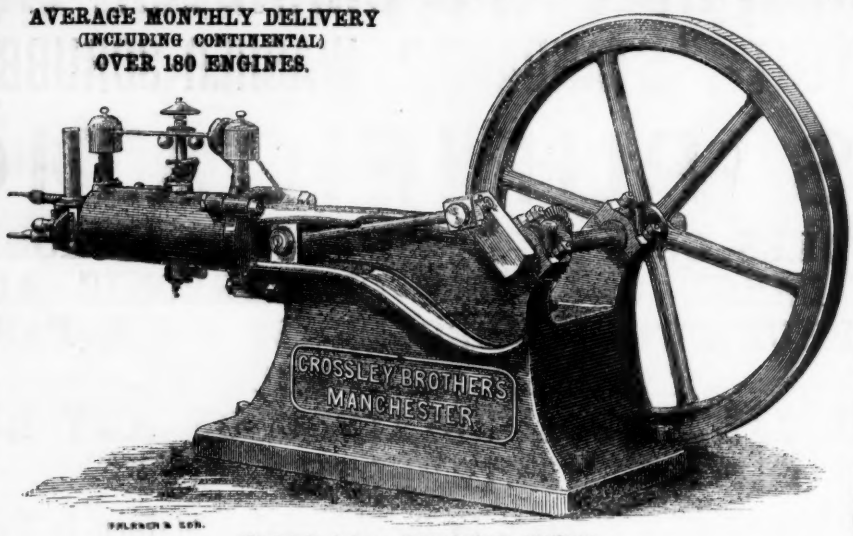
FOR FURTHER PARTICULARS AND TESTIMONIALS, ADDRESS MESSRS.

KIRKHAM, HULETT, & CHANDLER, LIMITED, { 59 & 60, Palace Chambers, Bridge St. Westminster, London, S.W.

AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

These Engines are used at the following Gas-Works:—Birmingham, Brentford, Bucharest, Bishop Stortford, Driffield, Dundalk, Dundee, Dublin, Huddersfield, Hinckley. London—London Gas-Works, Phœnix Gas Co., Gaslight and Coke Co., South Metropolitan Gas Co., Commercial Gas Co., Crystal Palace District. Leominster, Edinburgh and Leith, Ludlow Union, Lancaster, Maidstone, Nuneaton, Northampton, Shanghai, Sheffield, Worcester, Wantage, &c.

AVERAGE MONTHLY DELIVERY
(INCLUDING CONTINENTAL)
OVER 180 ENGINES.



Over 2500 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE,

From ½ to 40 Horse Power Indicated.

(Otto and Crossley's Patents, 1876 and 1877.)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. CASES NOT CHARGED IF RETURNED FREE.

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

WORKS AND HEAD OFFICES:
Gt. Marlbro' St., Gloster St.

CROSSLEY BROTHERS, MANCHESTER.

LONDON HOUSE:
116, Queen Victoria St., E.C.

WARNER'S RETORT-HOUSE MACHINERY.

[*As Illustrated and Described in the* JOURNAL *for May* 4.]

Communications to be addressed to

W. J. WARNER, GAS-WORKS, SOUTH SHIELDS.

NO MORE WASTE LIME! SAVE THE VALUABLE PRODUCT!

G. R. HISLOP'S PATENT REGENERATIVE PROCESS

Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

The process, in operation, may be seen at the Corporation Gas-Works, Paisley, where the Lime has been restored 120 times. Inspection is cordially invited.

For Terms, apply to GEO. R. HISLOP, F.C.S., Engineer, Gas-Works, PAISLEY, N.B.

PARIS EXHIBITION, 1878.

THREE MEDALS

AND

HONOURABLE MENTION

HAVE BEEN AWARDED TO

JOSEPH CLIFF & SONS

For their Various Exhibits, amongst which is a

SILVER MEDAL

FOR THEIR

PATENT MACHINE-MADE

RETORTS AND FIRE-BRICKS,

Being the Highest Honour given for this class.

Established

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL

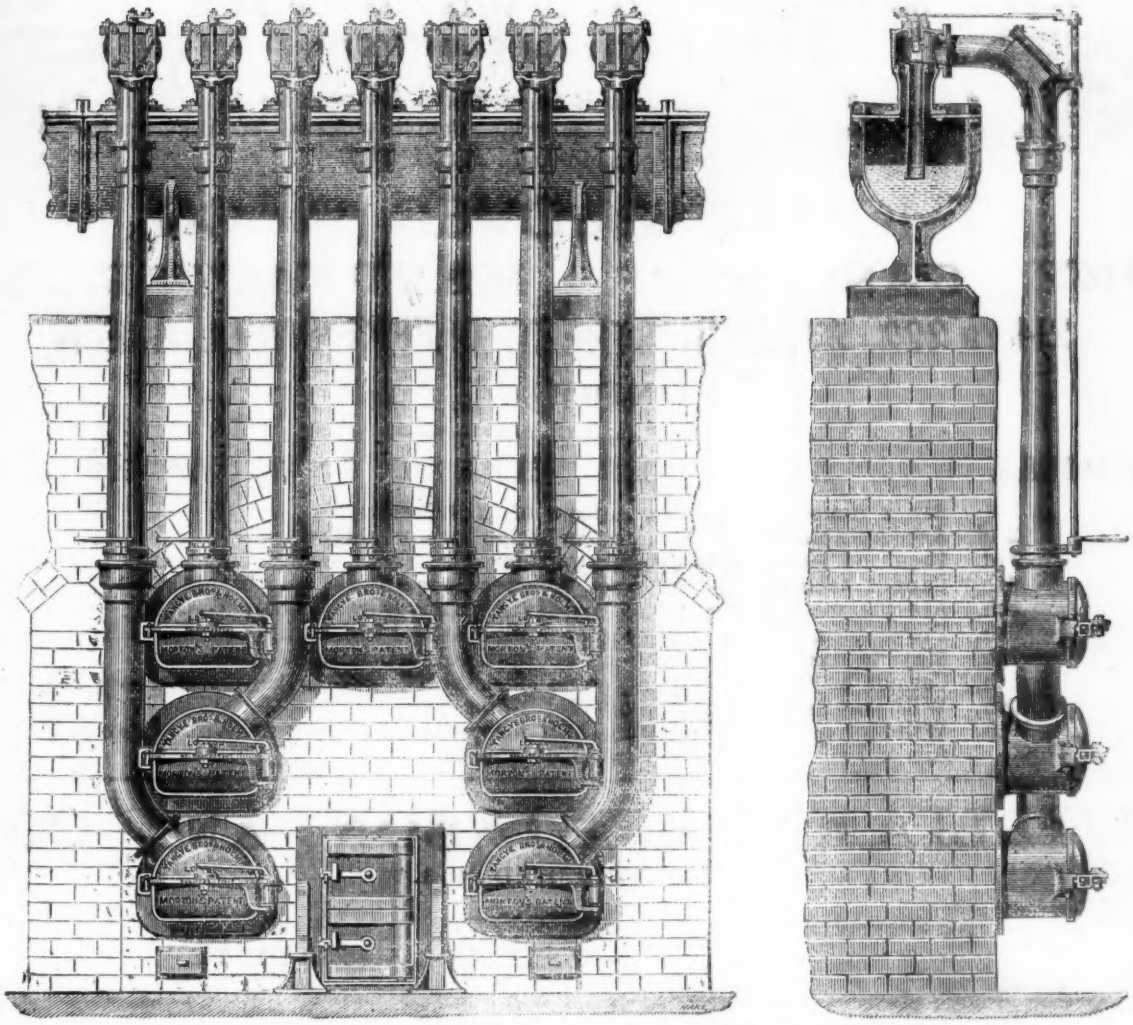
WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N. Liverpool: Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

HOLMAN'S PATENT
NON-PRESSURE VALVULAR SEAL-PIPES
FOR
HYDRAULIC MAINS.



The salient features of the above arrangement are as follows:—

1. The Seal is instantaneously opened and closed from the stage by the stokers.
2. There are only two positions for the actuating lever: one when the Seal is opened during the period of carbonization, the other when it is closed for drawing and charging the retort.
3. The retort can never be blocked, beause the port directing the gas *through* the Seal is always opened, and the port permitting the gas to *pass* the Seal *direct* into the hydraulic main is also open while the retort is at work.
4. The manager and stokers can always see at a glance, by the position of the lever, whether the retort is duly unsealed while carbonizing its charge.
5. There are no extraneous seals, stuffing-boxes, hinges, screws, chains, pulleys, springs, teeth, or other complication belonging to the valves; they are made plain and strong for rough use, and will last many years without renewal.
6. The valve faces are always covered and never separated, hence no foreign matter can put them out of action.
7. They are positive, reliable, interchangeable, free from all the uncertainty of automatic arrangements, and low in price.
8. No extra pipes or connections are required, because the Valvular Seal-pipe is self-contained in the single branch of the ascension-pipe, which stands on the hydraulic main, and is easily accessible by removing an ordinary cover secured by two bolts only.

(238) TWO HUNDRED AND THIRTY-EIGHT HOLMAN'S PATENT VALVULAR SEAL-PIPES are being fitted to the Hydraulic Mains at the Radford Station of the Corporation Gas-Works at Nottingham.

(84) EIGHTY-FOUR more are being fitted to the Mains in the New Retort-House of the Gas-Works at Brentford, and they can be readily applied to existing Hydraulic Mains generally.

They are to be fitted to the Hydraulic Mains of the New Retort-House at the LONDON GAS-WORKS, and at other large stations.

Mr. MORTON writes in the following terms, under date of Feb. 3, 1880:—

"Gentlemen,—I have determined to use your HOLMAN'S PATENT NON-PRESSURE VALVULAR SEAL-PIPES in our new Retort-House. Will you, in the meantime, send me, as soon as you can, four as you are now making them. I expect to hear of a large demand for these Pipes. I like the idea of always maintaining a passage through an ordinary dip."

ESTIMATES for Retort Work, including Mouthpieces fitted with Morton's Patent Self-Sealing Lids and Holman's Self-Sustaining Cross-Bars and Fastenings, Hydraulic Mains and Ascension-Pipes, fitted with Holman's Patent Non-Pressure Valvular Seal-Pipes complete (as per accompanying illustration), will be forwarded to Engineers on receipt of particulars of intended erections. or re-setting of Retorts during the current or ensuing season.

Engineers preparing Specifications will be furnished with Tracings and all necessary data on application.

Sole Makers:

TANGYE BROTHERS AND HOLMAN,
HYDRAULIC AND GAS ENGINEERS,
CORNWALL HOUSE, QUEEN VICTORIA STREET, LONDON, E.C.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

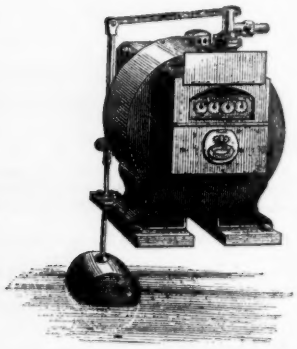
LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816.)



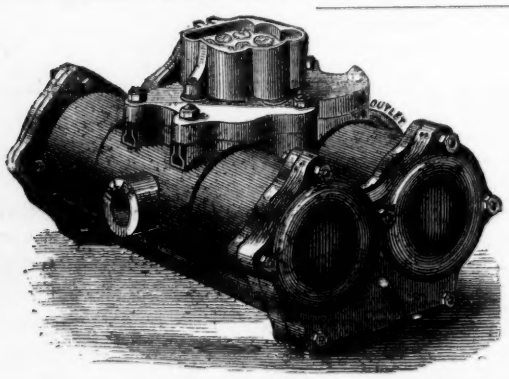
LOW-PRESSURE WATER-METER.

This Meter will register with perfect accuracy, either at full speed, or with a few drops only passing through it.

It must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below.

Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply a the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



HIGH-PRESSURE WATER-METER.

The Union Water-Meter, of which an external view is here given, is of the positive class—*i.e.*, a Meter in which a measuring chamber is alternately filled and emptied, each filling being duly recorded. It is formed of two cylinders, with double pistons in each, having a rotary-valve of peculiar construction, which is worked from cams on the piston-rods.

It is claimed for this Meter, among its advantages over other Piston Meters in use, that it is extremely small and compact, and that its durability and accuracy have been proved by the fact that upwards of 20,000 of them, of various sizes, are in successful operation in the States. In England the instrument has been fully tested by several Water Engineers of eminence, and pronounced by them as a reliable and satisfactory register of water supply; it is also economical in cost.

ALL METERS are TESTED with 60 lbs. pressure before they are sent out.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

A. F.—*Received.*

R. B.—*Certainly not, within your parliamentary limits.*

ENGINEER.—*Such a matter must be the subject of arrangement before the transfer. The purchasing Corporation are not bound to pay any compensation at all.*

SOUTH METROPOLITAN GAS-WORKS.—*Owing to pressure on our space to-day, we are compelled, at the last minute, to hold over the continuation of the description of these works, which, with illustrations of the gasholder-tank (as completed), is in hand.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, NOVEMBER 9, 1880.

Circular to Gas Companies.

THE beginning of November is to the elected of the ratepayers in English Municipalities as full of portent as were the Ides of March to the Roman Emperor. On Monday last the official fate of many Town Councillors was decided for the ordinary period of three years, and while some were relegated to the obscurity of private life, an equal number of citizens have taken their places in the honourable and honorary office of ratepayers representative. The functions of local government authorities are easy of comprehension, and they are, as a rule, strictly adhered to in the ordinary transactions of English municipal bodies. To keep watch over the material development of their town, to regulate the conduct of their fellow-citizens, as well as to provide for their supply with all the necessaries of modern corporate existence, are accepted by our local authorities as ample and exclusive occupation, to the positive proscription of all those considerations of party politics, the omnipresence of which in similar organizations across the Channel so frequently causes them to be held in detestation by the Central Government. In this respect it is of incalculable advantage that the relations of even our largest Municipalities with the Executive are naturally of a strictly business character, as is the proper employment of the local bodies themselves; so that the question, say, of the application for permission to borrow money by the Corporation of Liverpool or Birmingham, is not prejudiced by the consideration that the Administration of the day is compelled, by political considerations, to treat the application otherwise than on its merits.

Such being the facts, and non-interference in party politics being one of the fundamental rules of municipal life *per se*, it is not a little puzzling to a believer in the fitness of things to find that, in the great majority of instances, the question of who shall be returned to represent ratepayers in matters of street lighting, water supply, or sanitation, depends not at all on the special capability of a candidate for office for dealing with such subjects, and seldom on his known personal eminence, but chiefly, and indeed almost solely, on his notoriety as a partisan in connection with matters respecting which his mouth is expected to be shut as soon as he attains the distinction to which he aims. *The Times*, in a recent leader on the results of the late municipal elections, reflects on this curious inconsistency in the elements of corporate life, and lectures party leaders and managers for their tendency to push the admitted incongruity so far as to injure the public service, by deliberately turning the machinery of local self-government into a party organization with ulterior objects. The complaint is well timed, and the danger is not chimerical; but it is not very clear how any town thoroughly given over to the kind of influences of which the immaculate borough of Eatanswill stands as the great exemplar, is to be redeemed from its evil ways, and converted to the practice of reason. The disease is widespread and endemic where it has taken root, and where it is most virulent nothing short of the drastic remedy which sometimes follows upon a Royal Commission, and makes the name of politician a term of local reproach, will eradicate it. The irrationality of mixing up municipal finance with Conservatism, or jumbling a belief in the propriety of the acquisition of gas-works with the profession of sound Liberal principles, is one of the most hopeless features of the phenomenon, for argument is paralyzed before heresy that laughs at logic. And yet, although so absurd in its details, the origin of the political colouring of our non-political Town Councils is sufficiently rational. The performance of a Councillor's duties involves the devotion of more time and energy than would, in general, be accorded by any man, unless he happens to possess abundant leisure, or has a born liking for public work. In the former case he is unlikely to figure conspicuously in local affairs as a leader of men, but in the latter he is usually already deep in more than one kind of public occupation, and, as a politician by nature, cannot help going into a representative assembly with the party marks upon him. As long as politics excite more attention in town and country than any other subject of public interest, we must expect ambitious persons to make use of the power of party union for every purpose which it can be made to serve—and helping a man into a town council is one of them.

So far we have treated mainly of politics as affecting the candidature of individuals for municipal honours, and have seen that it is not the best men who succeed, so frequently as the ardent partisans of principles widely separated in every possible way from practical urban administration. But when we proceed to examine the acts of local government authorities, and the motives which actuate men within the council chamber, it will be found that in every parliamentary borough in the kingdom the most indifferent matters are generally decided with far too direct reference to party lines. In spite of the neutral character of the relations of a Municipality with Parliament or the Executive, it is often seen that the debates on the very relations in question are conducted on both sides in the most violent spirit of faction. We could fill columns with instances of this—from Bolton, where a "Radical minority" is credited by a local print with packing a town's meeting, and thereby ensuring the rejection of a proposed Corporation Bill; to Exeter, where, at the late election, the Conservatives, being weighted with the suspicion of favouring extravagant expenditure of the city funds, "barely succeeded in retaining their majority in the Council." But it would be waste of time to multiply instances of practices generally known, and, we hope, universally condemned. That a good party leader in a Municipality sometimes effects, by the help of a body of disciplined followers, salutary reforms which of themselves might have waited for a long time for advocates as zealous as himself, is perfectly true; but it is also certain that right and justice do not invariably appertain to the majority—especially when the majority is created without reference to the subjects on which it has to adjudicate—and therefore the same power is equally available as an instrument for evil as for good. We would fain hope that as a knowledge of what really constitutes corporate welfare spreads among the ratepayers of our towns, and as the peculiar duties and responsibilities of Urban Sanitary Authorities become more distinctly appreciated, and dignified by the example of thoughtful men to whom the care of the

health and corporate welfare of their fellow-citizens is a pursuit sufficiently honourable for its own sake, the influence of party politics will correspondingly cease to determine the constitution of Gas Committees or Water Departments, and that the time will be gone when it may be said, as at present in an important Midland town, "If we were to supply six-"teen and a half candle instead of seventeen and a half "candle gas, our present Liberal Council would be scattered "to the winds by an indignant public, and the Conservatives "would come in with a large majority!"

Dr. Siemens has written a long letter to *The Times*, in reply to Mr. Preece's communication on the subject of the danger of the electric light, to which we alluded last week. We are not concerned with the differences on electrical matters existing between these two eminent authorities; but Dr. Siemens comes more within our province when he goes on to speak of the value of gas as a heating agent, with direct reference to the present agitation on the great smoke and fog question. Dr. Siemens points out that in the case of factory furnaces there is no longer any excuse for the consumption of fuel in such a manner as to send forth smoke from the chimneys, as by the mere adoption of gas firing all smoke is not so much consumed, as entirely prevented. The veteran originator of the regenerative furnace goes on to advocate the use of gas fires upon the domestic hearth, not of the usual pattern, which may, in general terms, be described as consisting principally of fire-clay and asbestos kept in an incandescent state by a gas-flame from beneath, but in a combination of coke and gas with a solid plate substituted for a fire-grate. The gas is applied to the coke from the front, and Dr. Siemens expresses himself as thoroughly satisfied with this arrangement, which he uses in his own house. The combination is not new, having been introduced nearly thirty years ago, somewhere about the time when Dr. Siemens says he tried to get a Bill through Parliment for supplying Birmingham with heating gas, in which he failed, as he states, in consequence of the opposition offered by the local Gas Companies. We do not here wish to rake up the ashes of a controversy which terminated so long ago, especially as there is no apparent intention on Dr. Siemens's part to renew it. It may, however, be said that the failure of Dr. Siemens's efforts at that time was due to other causes than the opposition of any local competitors, although they may have led the attack on the innovation. We must regard the project of supplying a heating gas in the manner proposed as having failed in ..lity from its own weakness, or it would assuredly have been adopted elsewhere, though Birmingham would have none of it. In such cases as this, where two analogous processes contend or mastery, and one is victorious while the other becomes extinct in consequence of one defeat, there can be no doubt that it is the fitter which survives. Dr. Siemens, of course, could scarcely be expected to put forward these considerations, and, after all, the chief interest of his letter is to be found in the statement that he has discovered a satisfactory means of using common coal gas for the purpose of warming his residence.

Mr. Hunt and the Gas Department of Birmingham must be congratulated on having succeeded in demonstrating the effect produced when streets and open spaces are lighted by gas in a proper manner. The result, up to the present time, of Mr. Hunt's experiments with powerful gas-burners and the lanterns for use with them, has been the adoption by the gas department of Bray's burners with a globular lantern, constructed in accordance with an original design in the Corporation workshops. As our readers will see, when we publish the engraving we are having prepared to accompany the estimate, which is to be laid before the Town Council, of the cost of maintaining the lamps, the space in front of the new Council Hall selected for the inauguration of the new system of lighting is irregular in plan and contour, whereby the difficulty of satisfactorily illuminating it and of avoiding shadows is considerably increased. But the success which has attended the attempt is very complete, the whole of the roadway and side paths between the Council Hall and the Town Hall, and in the immediate neighbourhood of the recently-erected Chamberlain Memorial, being at present admirably lighted every night. The Corporation have lately made some striking improvements in this locality, and as the lanterns adopted are not entirely covered with opal glass, only the actual centre of the globular lamp being so lined inside, the buildings surrounding the favoured site of the brilliant display of the gas department are illuminated to the roof in every detail. It may be expected that the department, having entered on this course, will have some difficulty in deciding where to stop, as a demand will certainly arise, from other and even busier quarters of the town, for similar illumination. While referring to Birmingham affairs, it may not be uninteresting to state that it is the practice of the gas department to open the works for the inspection of general visitors on certain days. Ratepayers are, on application at the gas offices, supplied with tickets to view, and are conducted over the manufacturing stations by guides, whose descriptions are supplemented by lithographed plans, with which the visitors are provided. The privilege is valued by the public, many numerous parties being shown over the works on every visiting day; and the Gas Committee probably find the education thus given to their constituents by no means wasted. This Birmingham practice might with advantage be imitated elsewhere, for if a gas consumer feels himself called upon to write to a local paper with reference to the "air-pump" which he *knows* is somewhere on the works, a preliminary visit with the object of finding that celebrated piece of apparatus might enlighten his mind in many ways.

We would draw the attention of those of our readers who are interested in the subject of coal carbonization to the very carefully argued communication from Mr. G. E. Stevenson, which appears in another column. The writer succeeds in placing the question in a light which should materially assist in directing observation upon the real points at issue, and appears to have carried his analysis of the problem quite as far as is useful or necessary on general principles. The next step, to bring the matter from the general down to the particular, is to apply his method of reasoning to the results given by any description of coal. It should not be difficult to interpret the results of coal analyses in accordance with the doctrines laid down so clearly by Mr. Stevenson.

An announcement made by the Secretary, Mr. W. North, at the recent meeting of the Midland Association of Gas Managers at Birmingham, respecting the formation of a medal fund, is deserving of particular notice. The fund, although only started at a Committee meeting, has already attained the respectable figure of £330, which will in all probability be much increased. The medal is to be awarded for original research in gas manufacture, and we may be allowed to express a hope that the custodians of the fund will be enabled to place and keep their medal high among the few peculiar distinctions which are reserved for workers in the particular field in question. The circumstances under which the Birmingham medal will be awarded have yet to be determined upon, but we assume that it will be free and national in its application. The responsibility of disposing of a reward of this kind is by no means slight; one or two mistakes in the bestowal are generally sufficient to rob it of all estimation, and in that case the design of the founders is frustrated, and their contributions are wasted. On the other hand, an honourable reward is too frequently thrown away upon men who, by a taking invention or happy discovery, have become famous, and are therefore placed beyond the need of a species of encouragement they would either value lightly or use as a gratis advertisement. Between these two extremes of insufficient deserts and superfluous notoriety lies a wide space, wherein may be found many original workers, numbers of whom, perhaps, are never destined to see their labours bring them any substantial reward; they may, indeed, be patiently gathering observations, and doing unpretentious work of which others, more brilliant or more fortunate, may in time make a wonderful use. These are the men to whom a kindly recognition is of value, and it is among them that the disposers of the Birmingham medal will find the most suitable recipients of their gift.

The paper on sulphate of ammonia manufacture, read at the last meeting of the Midland Association of Gas Managers, by Mr. G. E. Stevenson, of Peterborough, was an exhaustive account of a very complete little factory for disposing of the ammoniacal liquor made at the author's works. From considerations of safety, Mr. Stevenson has been led to adopt the dilute acid system of manufacture, and in small works the difference between working with dilute and concentrated acid is perhaps not of much moment, but in some cases the use of strong acid is of very palpable advantage. Mr. Stevenson's commendable readiness to impart any information he may possess to his brother Managers is only equalled by his desire of the same treatment in return, and it is to be regretted that for lack of this reciprocity he was unable to give a comparative statement of the results of his method of working as compared with others, although some information

useful for purposes of comparison came out in the subsequent discussion. Mr. H. Woodall subsequently raised a very important question in his paper on the subject of meter-rents, and the advisability of charging specially for the use of this particular class of the necessary plant of a gas undertaking. As, however, we treat of this subject elsewhere we need not here further allude to it.

Water and Sanitary Notes.

The present position of the Metropolitan Water Question will be found discussed at some length in another part of our columns, more especially with reference to the Government of London. We may here observe that Sir W. Harcourt refers the Vestry Delegates to the answer given by the Earl of Fife to Earl Fortescue in the House of Lords last August. This shows that the Government intend to go no further at present than the formation of the Water Authority which is to investigate the whole subject. No Bill for the purchase or regulation of the London Water Companies will be introduced by the Government during the ensuing session. Still less is it to be expected that the Government will introduce a competing scheme. This programme is much too slow for such ardent spirits as the Vestry Delegates and the Corporation of the City, and Sir W. Harcourt may find that he has raised expectations which it will be by no means easy to gratify. In the Court of Common Council on Thursday, it was referred to the Gas and Water Committee to "consider the advisa-"bility of offering a substantial premium or premiums to "engineers and others, for the best plan or mode of supply-"ing the City or the Metropolis with water." The best plan might be supposed to consist in an amalgamation, complete or partial, of the existing Water Companies, and a re-arrangement of some of the distributory works. Lieut.-Col. Bolton has a plan already prepared for the purpose, and we greatly doubt whether the Corporation will meet with anything better, supposing they decide on carrying out the idea which has been referred to the Gas and Water Committee.

Paddington is suffering from sickness attributed to two sources—mud and milk. The banks of the Grand Junction Canal are alleged to be in a highly offensive state, emitting odours which are of a most unwholesome nature, creating fevers and other maladies. Dr. Stevenson, as we mentioned last week, has traced the outbreak of scarlet fever to the importation of infected milk from two farms in Oxfordshire. The question arises whether a similar explanation is available in respect to other Metropolitan localities where the same disease is making its ravages, causing serious suffering and inconvenience among the poor. Schools are being shut up, and in several of the reported cases the means of livelihood are cut off, owing to the suspension of indoor employment, as in the case of journeymen tailors and others who have been in the habit of carrying on their work at home. That the water supply is not in fault may be inferred from the fact that the disease is rampant in a locality near the Shooter's Hill Road, where the supply is derived from the works of the Kent Company. Scarlet fever also affects the City, where the supply is from the New River, as well as Brixton, where the source is again different. Bethnal Green, Poplar, Southwark, Greenwich, and Deptford are all troubled with this infectious disease. It also shows itself in the provinces, including Sunderland, Leicester, and Oldham. In Dundee, scarlet fever has proved fatal to members of good families, residing in houses which apparently ought to be healthy. After much perplexity, the Sanitary Authorities of Dundee are said to have traced the origin of the epidemic to the milk supply, affording one more instance of the milk being found guilty where otherwise the water would probably be condemned.

The terrific floods of the last few weeks have given fresh impetus to the agitation for the creation of watershed boards. The old artificial boundaries of the counties and the boroughs are found wholly unsuited to the proper management of the rivers, and the subject is to be brought before Parliament next session by Mr. Magniac, who will introduce a Bill for the purpose, but in the hope that the Government will be thereby induced to bring in a Bill of their own. Mr. Magniac lays down the principle that the upland proprietors should contribute, though in a reduced degree, to the expenses incurred in the prevention of floods. There is much to be said in favour of this view, inasmuch as the upper districts discharge the water which floods the lowlands. The proprietors of the lowlands should contribute because they are benefited, and those of the uplands because they have originated the mischief. Such is the argument, over which there will, of course, be a struggle.

The deputation appointed by the Magistrates and Council of Glasgow to visit various towns for the purpose of discovering the best mode of dealing with the sewage that now pollutes the Clyde, have presented a long and interesting report on the subject, to which we may perhaps advert more at length on a subsequent occasion. The report recommends that the sewage of Glasgow be intercepted by means of sewers to be constructed for the purpose north and south of the river, and that the sewage should be treated by some method of intermittent precipitation before being discharged into the stream. The report suggests that steps should be taken to discourage the use of water-closets, and to limit the discharge of manufacturing refuse into the sewers. The absolute necessity of restoring the Clyde to a state of comparative purity, by some means or other, is distinctly recognized "as a matter of necessity and not of choice."

The disposal of what may be called the dry refuse of towns is attracting increased notice, especially where the population is large. Dr. Sedgwick Saunders, in a report to the City Commissioners of Sewers, states that he has been carefully watching this question for the last three years, and believes that the law will, at no distant period, interpose to prevent the treatment of town refuse in the midst of populated districts. He deems the subject so serious as to demand the immediate attention of the City authorities, and it has accordingly been referred to the Sanitary Committee for consideration. The same topic was mooted at the Limehouse District Board of Works a few days ago, when it was suggested that an apparatus like that now employed at Leeds might be made to suffice for the whole of the Tower Hamlets. We mentioned last week that the subject was already receiving the attention of the Paddington Vestry, and we may expect to hear of it from time to time in other quarters. The question at issue is analogous to the sewage problem, but happily is less difficult to deal with.

The Danger of the Use of Water Gas.—An American correspondent sends a copy of the *Yonker's Gazette*, of the 16th ult., with the remark: "I forward by this mail a paper marked with an account of a suffocation with our much-boasted 'Municipal water-gas.' There are many such cases here, but few that are reported in the papers." The following is the paragraph referred to:—"In the broad silk department of W. H. Copcutt and Co.'s silk factory, Nepperhan Avenue, on Friday morning, by the escaping of gas, about 15 of the *employés* of that room were prostrated. The morning being cloudy, the gas was lighted, and for some reason was not turned off when the lights were put out. About two hours after this one of the girls complained of feeling sick, and several others complained of severe pains in the head. The doors and windows were thrown open, and as soon as the fresh air was let in several more fell prostrate and were carried out of doors, where they partially revived, and those able were assisted to their homes and others conveyed in carriages. R. F. Roberts, foreman, and James Early, of this department, succeeded in procuring physicians for those who were thus affected. Daniel Sweeney, living on Hog Hill, reached his home, when he fell prostrate. He will recover. Mrs. M. Kilgour, of Yonker's Avenue, was taken home in a carriage, and lies in a critical condition. Mary Hardley, residing near the factory, received medical assistance, and is improving. Miss Maggie Higginbotham, of Chestnut Street, walked to her home, and immediately went into convulsions. She is improving. Mrs. M. Birch, residing on Palisade Avenue, was taken to her home in an insensible condition, and doubts of her recovery are expressed. Others were similarly, though not seriously affected."

Institution of Civil Engineers.—The weekly meetings of the Institution will be resumed this evening, when the session will be inaugurated by the reading of a paper on "Machinery for Steel Making by the Bessemer and the Siemens Process," by Mr. Benjamin Walker, of Leeds. Accompanying the official notification of the meeting is a list of subjects for premiums, giving suggested titles for papers on various matters concerning the art of the engineer. These subjects are for the most part of the same nature as in former years, but there are some significant additions, notably on "The Action of High Winds on Lofty and Exposed Structures, and the Best Methods of Determining the Force of the Wind." It is to be observed that the interest on the trust funds dispensed by the Institution amounts to nearly £450 per annum, the whole of which sum is available for premiums and prizes, and with certain limitations (directed by the donors in two cases) no distinction is made in awarding the premiums between a Member of the Institution and any other person, whether a native or a foreigner. In the case of the Students, the Miller prizes, and the Miller scholarship of £40 a year, tenable for three years, are restricted to members of this class, whose papers read at the supplemental meetings are deemed worthy of premiation. In the circular, reference is made to the Library, believed to be the most complete collection of engineering literature in existence, but which requires necessary efforts to keep it abreast of the times. Finally the members are urged to make more use of the Institution by testing the services of its officers, in the belief that advantage may thus accrue both to the individual and to the Society. Altogether there seems to be disposition and a desire to carry out, in the spirit as well as in the letter, the objects for which the Society was formed more than half a century ago—viz., the collection and diffusion of professional knowledge. In addition to the one mentioned above, the following are in the list of subjects for papers:—"On Proportioning Mains for the Distribution of Water and Gas." "The Methods of Protecting Metal Work exposed to Corrosion, with examples." "The various Descriptions of Pumps employed for Raising Water or Sewage, and their relative efficiency." "The Flow of Water through Pipes and Conduits, with experiments in verification of the existing formulæ, and suggested amendments and improvements." "The Mechanical Separation and Chemical Treatment of Sewage, with analyses of the effluents and of the sludge, and statements of cost in proportion to population and rateable value." "The Modes of Regulating the Action of Storm Overflow from Sewers, and the Flushing of Sewers." "The Methods used for Determining the Discharge of Rivers, with a description of the Floats and Current Meters employed for the purpose."

METER-RENTS.

THE subject of the policy or impolicy, the propriety or otherwise, of charging a rent for gas-meters, is one that has often been raised in our columns. It has also at intervals been discussed at several meetings of Gas Managers, always evoking opinions as divergent as they are usually emphatic. The paper read by Mr. H. Woodall, at the recent meeting of the Midland Association of Gas Managers, which we publish to-day together with the discussion upon it, shows that the freshness has not worn off from the topic. It would also seem to show that little advance has been made towards uniformity of opinion on the subject. This want of agreement, though it is specially noticeable in reference to meter-rents, extends further; for, on the cognate questions of discounts or of a differential rate of charge according to the amount of consumption, the difference is probably quite as great. These divergences of opinion and practice are, it may be asserted, due to the adoption of different standpoints from which to regard the same question. For instance, a desire to increase the number of consumers, to simplify accounts, or to remove a source of frequent disputes, would point to the desirability of abolishing the charge for meters, although it would involve an increase in the charge for gas equivalent to the rental surrendered. The same result would follow if a gas undertaking were conducted upon what are understood generally as benevolent principles—in the interest, that is, of the small, who are assumed to be the poor, consumers. On the other hand, it is maintained, and we cannot but think with much force, that such a shifting of the burden would be unfair to other sections of the consumers at least equally deserving of consideration.

We need hardly point out that the parallel often drawn between gas-meters and measures used by tradesmen in serving other goods to their customers, is very halting and imperfect. The tradesman with a set of scales or measures serves to any number of people as much of his goods as they agree to take; the Gas Company conveys to the houses of its customers a practically unlimited supply of its commodity, to which they are at liberty to help themselves. The meters provided are assumed to be no more than sufficient for the registering of individual consumptions, and cannot possibly be applied to the measurement of any other supply. Thus a meter becomes as essential a part of the consumer's personal service as is the burner or the fitting carrying the burner. If the consumer chooses, he may provide his own meter, and in many more cases than at present this would be done, but for the well-grounded belief that it is more economical to allow the Company to do it for him.

Under the legislation which has hitherto governed Gas Companies, exclusive privileges have been granted them, because so, it has been seen, the interests of the consumers could best be served. A limited dividend has been allowed and a price has been fixed, sufficient, it has been assumed, with proper care and economy, to allow of the earning of that dividend. The large majority probably of British Gas Companies are paying the full dividends allowed, and could do so without the help of meter-rents, and yet keep within the maximum price for their gas. It is in these cases not necessity, nor a desire for larger profit, which causes the charge; but, it is fair to assume, a conviction of its justice. Neither are we aware of any occasion upon which its propriety has been questioned before a Parliamentary Committee. To the numerous Companies acting under the modern institution of the sliding scale, however—and their number is growing rapidly from year to year—the question has a far closer application, for the abolition of meter-rents would mean to them an immediate and considerable reduction of dividend, and that without conferring any real advantage on more than a section of the consumers.

The simple abolition of the charge for meters and increasing the price of gas so as to recoup the loss sustained thereby, is, we think, questionable policy. The ordinary charges for meters are equivalent to about twopence per thousand feet on the gross sale of gas, and this consequently would be the added charge upon the gas were the change made. It will be seen at once how oppressively this would weigh upon the large consumers. They, few in number comparatively, would have to bear the whole accumulated burden which previously had been much more easily borne by, and we think more equitably distributed over the shoulders of the larger class of persons whose gas consumption is, relatively to the cost of meters, smaller. This class is by no means confined to the poor occupants of small houses. There are very many meters of large size, fixed in churches and chapels, in large halls not in frequent use, and in other places, where the profit on the rental could not possibly pay for their maintenance and interest upon their first cost. In all such cases the abolition of meter-rents would mean the further taxing of the already more profitable consumers, as certainly as is the case in relation to the consumers as a whole in those towns where the Municipalities make large gifts out of gas profits to those who have not contributed anything towards the earning of them.

The proposal to meet the admitted hardship on the larger consumers by a differential charge for the gas, is one way of surmounting the difficulty where it is created, and it has much to recommend it. At the same time it appears to lack the absolute fairness of the charge for meters. Very large consumers may reasonably claim an abatement from the ordinary charge for gas, based upon the cost of distribution and collection, which in their case is often reduced to practically *nil;* and this is an abatement the justice and the amount of which can be readily determined. If, however, it is admitted, as we think it would have to be, that a large proportion of the consumers of a Company are made unprofitable by the abolition of the charge for meter hire, then we fail to see how any system of allowances to the larger consumers can save the latter from bearing the burden. Of course this charge makes the cost of gas higher proportionately to the small consumers, and is consequently a barrier in the way of its use, but the suggested raising of the price would be a still greater one. If the consumer burning, say, 5s. worth of gas per annum has that quantity delivered to his house at the same rate as his neighbour who consumes £50 worth, he is, in regard to that article, placed in a better position than with most other of his purchases. We think it is perfectly just and equitable that when the inevitable conditions of supply require that consumers shall have on their own premises instruments devoted to their exclusive use—pieces of plant provided for them, and proportioned as directly as possible to their individual requirements—they should bear their cost.

While holding this opinion, we would deprecate the practice, which is said to obtain in some towns, of making considerable profit out of the rental of meters. The actual cost of them is easily determinable, and this is all there can be any justification for charging. Every consumer should, so far as it is possible to secure it, contribute to the profit of the undertaking in proportion as he contributes to its rental. This principle would be abandoned altogether with the remission of the charge for meters; it would be equally violated if such charge were made excessive.

GAS LEGISLATION FOR 1880.

(*Continued from p.* 685.)

Eleven provincial Gas Companies obtained extensions of their previous parliamentary powers.

The *British Gaslight Company, Limited* (*Staffordshire Potteries*), *Act* empowers the Company to enlarge their works and to expend further capital at their Staffordshire Potteries station. Additional capital to the extent of £50,000 may be expended for the purposes of the undertaking; the previous capital expenditure having been £72,610. Of the new capital, only £40,000 is to be expended out of the capital stock of the Company, the remainder to be raised on mortgage. The dividend on the new capital is limited to five per cent., whether issued as ordinary or as preference capital; and an equal rate is the maximum permitted for interest on the new mortgage. There is no special direction as to the method of issuing the new capital. The Gas-Works Clauses Act of 1871 is incorporated with the Act. The gas supplied is to be of fourteen-candle power, and any gas examiner appointed under the General Act may prescribe the pressure at which gas is to be supplied, and may test the pressure, having power to open roads and streets for that purpose, giving two hours notice thereof to the Company. The usual provision for payment of interest on consumers deposits is inserted in the Act. The Company are to conform to the Act of 1871 in the manner of keeping their accounts.

The *Chester Gas Act* enables the Chester United Gas Company to raise additional capital to the extent of £50,000 by the issue of new ordinary or preference shares or stock of the unit value of £10, and to borrow £12,500 on mortgage in respect of the new capital, under the usual restrictions. The capital authorized by the Company's former private Acts of 1858 and 1870 amounted to £80,000 in shares, and £20,000 on loan, which has all been expended except £6000 in shares, and £2500 remaining to be borrowed. The new capital is to be issued in instalments of not more than £25,000 in the year following the passing of the Act, and £5000 in any

subsequent year; it is to be offered by auction or tender, and the premiums obtained on the sale are to be included in the gross amount authorized to be raised. The premium capital may be employed to pay off loans or for other capital purposes without dividend. The dividend on the new capital is limited to seven per cent. when issued as ordinary capital, or six per cent. for new preference capital. Payment of back dividends is to be confined to a term of three years, beyond which no such deficiency in the dividends in either of the old or new classes of capital is to be made up; provided that if the clear profits of the undertaking for three successive years shall amount to more than is required to pay the prescribed rates of dividend on the ordinary stock or shares, the corporate authorities of Chester are empowered to call upon the Company to make such a reduction in the price of their gas as, having regard to the provisions of the Gas-Works Clauses Act, 1847, with respect to the formation and appropriation of a reserve-fund, may be considered reasonable. In case of difference, the matter may be referred to arbitration, and in that case the Company have power to demand a new arbitration in the event of their profits becoming insufficient to meet the prescribed dividends. The Company are empowered to set aside out of profits a sum not exceeding one-half per cent. of their paid-up capital for the time being, for the purposes of a contingency-fund, but such fund, as accumulated, is not to exceed one-thirtieth part of the paid-up capital. Section 13 of the Chester Gas Act, 1870, is repealed in favour of a clause authorizing the appointment of a receiver by mortgagees. Two ordinary general meetings of the Company are to be held in each year, in February and August respectively. Regulations as to pressure are included in the Act, as also the other provisions as to testing and quality contained in the Gas-Works Clauses Act, 1871, and the Chester Gas Act, 1858.

The *Dartford Gas Act* authorizes the Dartford Gas Company to purchase additional lands, to raise additional capital, to amalgamate with the Darenth Vale Gas Company, to extend their limits of supply, and confers other powers upon the Company. The Dartford Company were incorporated by the Dartford Gas Act, 1867, for the supply of gas in the parishes of Dartford, Wilmington, and Stone, in the county of Kent, with an original capital of £4400, and £10,000 additional capital, now all expended, and the Company have borrowed £2500 on mortgage under their Act. The unincorporated Darenth Company were registered under the Companies Act of 1862 as a limited Company, for the purpose of supplying with gas Darenth and South Darenth, Sutton-at-Hone, Horton Kirby, Farningham and Eynsford, in Kent, with a capital of £6340 in shares, and debentures to the amount of £3300. The two Companies are dissolved and re-incorporated as one by the present Act, with extended limits of supply, including the two adjacent parishes of Sullingstone and Southfleet, and are also empowered to supply gas in bulk beyond such limits. The Company take powers to sell or let on hire gas stoves and fittings. The property of the two Companies is vested in the new Company as from July 1, 1880. The authorized capital of the two Companies as they existed on Dec. 31, 1879, amounting together to £24,400, divided into £10 shares, forms the capital of the Company incorporated by the present Act. This capital is apportioned in two classes, class A comprising the original capital of £4400 of the Dartford Company, and class B including the £10,000 old additional capital of the Dartford Company, the original £6340 paid-up share capital of the Darenth Company, and £3660 uncalled capital of the same Company. This unissued capital is to be offered first to the old Shareholders of the Dartford Company. The dividend on the "A" capital is to be ten per cent., and on the "B," seven per cent. Additional capital may be raised by auction or tender to the amount of £50,000, including premiums; not more than £10,000 to be issued during the first year, and £4000 in any subsequent year after the passing of the Act. The Company are also authorized to borrow on mortgage in respect of the original capital the sum of £6100, inclusive of the Dartford Company's previous borrowing powers and the amount already borrowed by the Darenth Company; and also to borrow £12,400 in respect of the additional capital sanctioned by this Act. Dividend on new issues of ordinary capital is limited to seven per cent., and to six per cent. on preference capital. Any insufficiency of profits made during a half-yearly period is to be borne wholly by the ten per cent. capital, until it is reduced to a seven per cent. dividend, after which both classes of capital are to bear an equal share of the deficiency. The purchase-money of capital sold by auction is to be paid within one week of the sale. The price of gas is not to exceed 4s. 9d. per thousand feet in the parishes of Dartford, Wilmington, and Stone, and 5s. 6d. per thousand feet in all other parishes within the limits of supply. The gas is to be of fourteen-candle power, supplied at pressures of six and eight tenths, as usually prescribed, and the Company are made subject to the General Act of 1871 as to testing. They are permitted to acquire five acres of additional land for the purposes of their undertaking, but not for the manufacture of gas or residual products.

The *Eastbourne Gas Act* confers further powers on the Eastbourne Gas Company for the purchase of land, the construction of works, the raising of money, and other purposes. The Company were incorporated in 1868 for the supply of gas within the town and parish of Eastbourne and the parish of Willingdon, with a capital of £50,000, and power to borrow £12,500; the whole of which has been raised and expended. By the present Act the limits of supply are extended to include the parishes of Westham and Pevensey. The Company are authorized by it to raise additional capital amounting to £150,000 (including premiums), in any of the usual forms, of £10 unit value. Not more than £30,000 of this new capital is to be issued during the first year, nor more than £20,000 in any subsequent year after the passing of the Act. Provision is made for borrowing on mortgage £37,500 in respect of the new capital. Dividend on new ordinary capital is limited to seven per cent., and to six per cent. on preference capital; and except otherwise provided at the time, no holder of any new preferential shares is to have a vote in respect of the same. Any deficiency of dividend is in future to be borne proportionately by all the different classes of stock or shares. The auction clauses are enforced, and the sliding scale is also imposed with an initial price of 4s. 4d. per thousand cubic feet. If the profits of the undertaking in any year exceed the amount required for meeting maximum dividends, an insurance-fund may be founded, with an appropriation of not more than one per cent. on the paid-up capital, until the fund amounts to one-twentieth of such paid-up capital. A reserve-fund is also permitted when the standard rates of dividend are increased under the sliding scale. Lands described in the schedule may be taken within three years by the Company for all the purposes of their undertaking, under certain conditions stipulated for the protection of parties. The Company take power to sell or let gas stoves, &c., and to take licences for using any patented or other invention in connection with the business carried on by them. The testing of the pressure and illuminating power of the Company's gas is to be in the manner prescribed by the General Act of 1871.

The *Lincoln Gaslight and Coke Company's Act* enables the Company principally to raise additional capital. The Company were incorporated in 1828 with a capital of £8000 and borrowing powers up to £2000, and by another Act in 1873 their powers were enlarged, and they were authorized to raise £20,000 additional capital and to borrow £20,000 on mortgage, and also to create improvement stock to the amount of £36,500, to be issued as fully paid-up stock, and distributed among the holders of the original share capital, the whole of which capital powers have been exercised, and £2000 has been borrowed but repaid. The dividend on the Company's original capital was limited to ten per cent., and to seven per cent. on the additional ordinary capital, and six per cent. on the new preference capital. The Company raised the £20,000 which their 1873 Act had permitted them to borrow, in the form of preference capital at five per cent. interest, instead of by mortgage. By the present Act the capital of the Company is defined to consist of £104,500—comprising original "A" stock, amounting to £8000; the additional stock of 1873, amounting to £20,000; capital "B" stock to the amount of £36,500; and new stock of 1880 to the amount of £40,000—with fresh borrowing powers to the amount of £10,000. The new stock is to bear interest at the rate of seven per cent., and to be raised by auction or tender. Not more than £10,000 of the new stock is to be issued yearly. All classes of stock are to bear proportionately any reduction of dividend that may occur. Certain of the sections of the Acts of 1828 and 1873, relative to voting, are repealed, and clauses are inserted giving Proprietors a vote for every £50 stock up to £500, and another vote for every £250 up to £5000, and a further extra vote for every £500 held over £5000. Power is also given for granting a pension to the present Manager of the Company, by consent of three-fifths of the votes of the Proprietors present at any general meeting.

The *Liverpool United Gaslight Company's Act* enables the Company to erect additional works and to extend their limits of supply. The Act incorporates the Gas-Works Clauses Act, 1871, with the reservation of certain clauses in the Company's Acts of 1848 and 1865, which affect the Corporation

of Liverpool, and, as to the latter Act, also concerning the illuminating power of the gas and the testing-place. The usual stipulation as to pressure is also inserted. The Company are empowered to manufacture and store gas on certain lands, having an area of about fourteen acres, adjacent to their Linacre works. The limits of supply are also extended to include the township of Orrell-and-Ford, in the parish of Sefton, Lancashire.

(*To be continued.*)

THE GOVERNMENT OF LONDON IN RELATION TO THE WATER SUPPLY.

An article by Mr. W. M'Cullagh Torrens, M.P., on "The "Government of London," in the current number of the *Nineteenth Century*, helps to show how intimate is the relationship between two prominent questions affecting the Metropolis. We have long contended that if ever the Water Companies were superseded, the Metropolitan Board and the Vestries would be likely to undergo a still more summary dismissal. Mr. Torrens clearly foresees the critical issues bound up with the water question, and is filled with apprehension lest the present excitement on that subject should lead to untoward results in respect to the local government of the Metropolis. But while there is fear on the one hand, there is hope on the other, and the member for Finsbury indulges the expectation that matters may take such a turn as to hasten that perfect municipal organization for which he has so long sighed and sought. His fear is that a bureaucratic party will know its opportunity, and will seek to bring into existence "a sub-department of the Local Government "Board, with a certain number of Water Trustees elected for "form's sake by the people, like poor-law guardians, to come "when summoned, sign their names in a book, listen to "orders, and go home again; leaving the whole direction "and management of another great branch of local taxation "to the Government of the day." With so much to fear, Mr. Torrens nevertheless asks "whether a central Water "Trust, elected in name or reality, must not be regarded as "the first story of a unified municipal edifice for the whole "of London."

It is not altogether easy to understand Mr. M'Cullagh Torrens. We question whether he quite understands himself in regard to the problem which rises up before him. He clings tenaciously to his theory of the "ten cities" on the banks of the Thames, the said cities constituting what is commonly called London. For each of these cities or towns he desires to secure distinct municipal powers. How these ten towns are to deal with the water supply as furnished by eight Water Companies is a species of dissected puzzle which Mr. Torrens seems rather at a loss to put properly together. The territory of the Companies extends outside the Metropolis, and the boundaries of the water districts in no case coincide with those of the so-called "cities." The necessity of one central body to deal with the whole is evident. But Mr. Torrens is far from being happy when he contemplates the possibility of such a power being created. When discussing this question nearly a year ago in *Macmillan's Magazine*, he contended: "If Lambeth or Southwark is dissatisfied with "its supply of water, by all means let Lambeth or South-"wark have the power to take care of itself in this "respect, either by compelling the existing Company to "serve it with a better article, or to secure that service "by other means." Again, "If Marylebone or Hackney is "satisfied with the quality furnished, why not let it save "the enormous outlay requisite for buying up the goodwill "of the existing service, and devising another to be supplied "from afar?" The answer to these queries is obviously found in the utter impossibility of making such a scheme work. It is perfectly true that there is a wide diversity between the local characteristics of various parts of London. What is there in common between Bermondsey and Belgravia, or Whitechapel and Chelsea? The contrast is great, and the same species of diversity may be traced among numerous other localities. Yet, after all, there are some things in which all London has a common interest, and in which there must be united action. Whatever defects may exist in the Metropolis Local Management Act, there is a principle recognized in that statute which cannot be overthrown. Thus, there is a proper distinction between interests which are local and those which are metropolitan. For the former we have the Vestries and District Boards, and for the latter the Metropolitan Board itself. Even the City, despite its antiquity and its wealth, is treated under the Metropolis Local Management Act very much as a District Board of Works.

The difference between the sectional and the general interests of London cannot be ignored. At the present time the Vestries and District Boards, moved by a common interest, are meeting together to consider the question of the London Water Supply. The Metropolitan Board is unable to take any action in the matter, but the Vestries feel that there is a sort of anomaly in leaving the Imperial Government to deal with the subject without any consultation with the Local Authorities. They want to know what the Government is going to do, and the Home Secretary tells them, in effect, that if they wait they will see. Anxious to dispose of the Water Companies, the Vestries begin to reflect whether they may not themselves be improved off the face of the earth. They have therefore settled down to consider what should be the constitution of the Water Trust. As we have intimated on many previous occasions, the first step specified by the Select Committee on London Water Supply was the creation of a "Water Authority," which would be in reality a kind of substitute for a Royal Commission. That such a body would recommend that the water supply be placed at its disposal is, of course, a very likely result. But the creation of an "Authority" to investigate appears a very odd mode of proceeding, and very few people seem capable of grasping the idea. But supposing that somehow or other the water supply gets into the hands of a central body, the question arises—how is that body to be constituted? On this point the Select Committee have made a proposal. The Vestry Delegates, at their meeting on Wednesday last, debated the point, and the idea was mooted that possibly the water supply would be handed over to an authority which would care nothing at all about the Vestries, and not very much about the ratepayers. Hence it was argued that the Metropolitan Board should have an increased number of members, so that the Board might be strong enough to deal with the mass of details connected with the supply of water to a population of four millions of people. What will be the final opinion of the Vestries on this point is not yet apparent, but a report on the subject, drawn up by a Sub-Committee, is to be laid before a meeting of the Delegates to-morrow. In the meantime a further communication has been received from the Home Secretary, in the form of a letter addressed to Mr. James Beal, which lets in a little light on the subject, though in a somewhat indirect manner. Pressed by Mr. Beal for some useful information as to the intentions of the Legislature concerning the water supply, Sir W. Harcourt replies, through his Assistant-Secretary, Mr. Godfrey Lushington, referring Mr. Beal to "the answer given by the Earl of Fife "on the part of the Government, in the House of Lords, on "the 16th of August last, in reply to a question on the same "subject." This answer was given in reply to an interpellation from Earl Fortescue, and the latter part of it ran thus: "The Committee of the House of Commons which sat upon "the whole question of the Water Supply of London, recom-"mended that an independent Water Authority should be "constituted, with adequate powers to deal with the whole "matter, and it is the intention of the Government to give effect "to the recommendations of that Committee." We may take this, therefore, as Sir W. Harcourt's answer to the Delegates, and the outlook is exactly what we inferred from the first. The whole question is to be shelved on to the shoulders of a Water Authority, that the latter may investigate the subject in its various bearings preliminary to coming before Parliament with such a scheme as the said Authority may deem advisable, whether of regulation, or purchase, or otherwise.

With this latest reply before them, the Delegates at their ensuing meeting may conclude that they are not particularly wanted at the present juncture. Sir W. Harcourt has had enough of the water question, pending the further action which is to take place at some indefinite period in the future. The appointment of the Water Authority is a playful demonstration, and all that follows may be left to take care of itself. Probably the Delegates will have other thoughts. In their eagerness they will look forward to the creation of the Water Trust, and already they seem to see that sublime body taking possession of the undertakings of the Metropolitan Water Companies. In considering how that body is to be constituted, we may presume that for their own sakes the Vestries will be loyal to the Metropolitan Board. If the water supply is to be transferred from the Companies, the Vestries would like to see it in the hands of the central body which they themselves create. The forthcoming Water Trust is a Red Spectre. The Delegates dread it, and will be the more afraid of it as it comes nearer to them. Mr. Torrens is half afraid of it, as likely to be fatal to the independence of the "ten "cities." In fact the member for Finsbury is almost falling in love with the Water Companies, for although they are not ten, they are eight, and that is better than if they were one.

For our own part we have very little regard for the ten towns theory, neither are we quite content with the fact that there are as many as eight Water Companies in London. Economy would suggest amalgamation, and Lieut.-Col. Bolton has pretty clearly shown what may be gained in this way. Mr. Torrens has no expectation that there would be any saving in the unification of the Companies under a Government Board. He may be right to a certain extent; but experience in reference to the gas question shows that amalgamation among the Companies results in a cheaper supply to the consumer. Mr. Torrens does well in pointing out the danger of what would be practically a Government monopoly. At the same time it would be impossible for the Metropolitan Board to take charge of the entire Water Supply of the Metropolis. The work is enough for one body constituted for the purpose, and if ever the Water Companies are to be got rid of, it is tolerably certain that a special authority will be created in their room; or else a very great change will have to be made in the authorities that now exist.

While Mr. Torrens would have ten municipalities, Mr. Firth would have but one. Thus great is the difference between Finsbury and Chelsea. Mr. Firth, we think, must know but very little of what has to be done to keep London in order, when he contends that the various powers residing in the Vestries "would be better exercised by a single central "authority." If this were possible, it would be equally practicable for the Metropolitan Board to take charge of the entire Water Supply of London. But everybody who has a practical knowledge of the question must be convinced that the Metropolitan Board could not possibly add to its own work that of the Vestries, nor yet that of the Water Companies. As the subject advances, this will become more and more apparent. If the Water Companies are to be superseded, a new authority must come into existence, or else the system of local government already established in the Metropolis must be revolutionized. Mr. Torrens admits that it would be easy, "were it thought "politic, to create another Central Board by way of election, "to whom might be confided the absolute control and "guidance in all matters connected with water consumption "and water supply." But he is opposed to any such plan, though he utterly fails to show how his ten municipalities would be able to manage the water supply, whether as regulating the Water Companies or taking their place. Mr. Torrens, we observe, is by no means desirous of seeing the London Water Companies swept away, and he says a good many pleasant things concerning them. We take his commendations for what they are worth, but we point to his testimony as showing how much is involved in the question of water supply. When writing in *Macmillan's Magazine* last December, Mr. Torrens was less favourably disposed towards the London Water Companies than we find him to be in his present article in the *Nineteenth Century*. The sign thus given is obvious. The outcry raised against the Water Companies is likely to be turned to account in dealing with the local institutions of the Metropolis. The Metropolitan Board, invested with certain controlling powers over the Water Companies, has failed to exercise those powers. It savours of retribution when we find the Vestries shrinking from the notion of a Water Trust, and Mr. Torrens trembling for the autonomy of the "Ten Cities of the Thames."

Mr. G. Henderson, Chairman of the Plymouth Gas Company, is about to be placed on the Commission of the Peace for the borough of Bodmin.

In connection with the recent discussion that has taken place in regard to the Employers Liability Act of last session, we notice among the joint-stock companies recently formed that the "Employers Liability Assurance Corporation"—which was registered on the 25th ult., with a capital of £1,000,000 in £20 shares—proposes "to assure principals and employers against liability arising from injury, damage, or loss occasioned by their agents, servants, workmen, and other *employés;* also to assure against accidents and damage caused by fire, explosion, lightning, or inundation."

Proposed Purchase of the Colne Water-Works by the Local Board.—A meeting of the owners and ratepayers of Colne, called on requisition by the Chairman of the Local Board, was held on Thursday, the 28th ult., for the purpose of getting the sanction of the ratepayers to the purchase by the Local Board of the Colne Water-Works, and of considering the advisability of applying to Parliament for powers to effect this and sundry other improvements in the town. The following resolution, on the motion of Mr. Hudson, seconded by Mr. W. Varley, was passed with only 8 dissentients:—"That this meeting of owners of property and ratepayers of the district of Colne and Marsden, in the county of Lancaster, do consent to the promotion by the Local Board of the said district of a Bill to confirm and carry into effect the purchase by the Local Board of the Colne Water-Works; to empower the Local Board to construct additional water-works, to make sewerage works, and to purchase lands for the treatment of sewage; to establish a market, to erect a market house and buildings; to make new streets and street improvements, to declare certain streets and places public highways; and to borrow money to carry out these improvements." It was stated by the Chairman of the Board (Mr. T. T. England) that the purchase-money would amount to £13,500.

Communicated Article.

THE TRUE BASIS OF CALCULATION FOR ESTIMATING ECONOMY IN CARBONIZATION.

By Mr. G. Ernest Stevenson,
Engineer of the Peterborough Gas-Works.

In dealing with this subject, it is imperative that all personal considerations be put on one side, if the purpose be to obtain a correct and impartial view of the question. It is quite possible for two individual managers of gas-works to adopt different principles of action in regard to carbonization, and yet for both to be pursuing the policy which will, in accordance with the circumstances in which each is placed, be productive of the greatest economy to the undertakings of which they have the management. For this reason men holding prominent positions in gas management need to exercise care in advocating one line of action, and depreciating another, lest by so doing they mislead some whose true policy differs from theirs, according to the different circumstances under which they are placed.

In the first place, in order to avoid falling into erroneous principles of calculation, it is necessary to have a clear view as to what are the fixed and what the variable quantities with which we have to deal. The gas sold is the first and most important factor, and if reduced to the 1000 cubic feet standard, for which a certain definite price is obtained, forms a firm and immovable foundation upon which to base the calculation of profit, this being practically the difference between the amount received per 1000 feet of gas, and the amount paid away in manufacturing 1000 feet of gas, and supplying it to the purchaser. Hence all calculations of saving effected must be finally based on the 1000 feet of gas sold, not on the ton of coal carbonized. This latter basis of calculation is useful as a rough-and-ready one for retort-house work generally, but may lead to very fallacious results if used to determine the question of economy where such marginal saving is considered as that derived from the manufacture of an extra 500 feet of gas per ton of coal carbonized.

The second important factor is the coal used. This we must consider in relation to its *cost per* 1000 *feet of gas* produced or sold, and *not as the standard unit* to which other expenses are to be reduced. Looking at it from this point of view, we shall readily perceive that the greater the cost of the coal in proportion to the other items of expenditure, the more important it becomes to effect a reduction in the quantity of coal used to produce a certain quantity of gas. Thus, for instance, if the cost of the coal were 20s. per ton, nothing would be lost by adding 1s. per ton to its cost for cannel, and at the same time producing 10,500 feet instead of 10,000 feet per ton of the same candle gas. The cost of coal per 1000 feet of gas produced being in this case 2s., we should be investing 1s. in raw material to produce in return one shilling's worth of the manufactured article. The only doubtful point left to be decided would be the gain by the reduction in the cost of labour, wear and tear, and interest on plant, as against the loss by reduction in the receipts for residuals. If, however, the cost of coal be 10s. per ton instead of 20s., the extra cost for cannel must not exceed 6d. a ton all round, otherwise a loss will be sustained on the gross cost of the coal.

Having, then, first to deal with the coal, let us consider what is to be got out of it by distillation, and how the proportions of the different products may be expected to vary according to the conditions under which the coal is distilled. Leaving out of the question the small quantity of atmospheric air which is introduced into the retorts along with the coal in charging them, it is evident we cannot get more out of the retorts, weight for weight, than we put in. Out of 2240 lbs. of coal, no more than 2240 lbs. of gas, coke, tar, and ammoniacal liquor, taken together, can be realized. In practical working not so much is accounted for, but we need not, at the present time, consider the loss. Supposing a ton of coal to produce 10,000 feet of gas, the weight of the various products will be approximately as follows:—

10,000 cubic feet of gas, at 37 lbs. per 1000 . .	370 lbs.
Coke	1465 „
Tar (10½ gallons)	129 „
Liquor (25 gallons)	276 „
	2240 lbs.

If 10,500 feet be produced from the ton of coal there will be an increased weight of gas, and a proportionate diminution in the weight of some other products. The reduction of weight in residuals to balance the increased production of gas will amount approximately to 18 lbs. In the absence of experimental records determining the proportion in which the coke and tar are to be debited with this reduction, it may, without risk of serious error, be equally divided between the two, the loss of tar in this case amounting to ¾ gallon, from which it would appear that Mr. G. Livesey is not far wrong in deducting 1 gallon of tar for 500 feet of gas. We should then get approximately as follows:—

10,500 cubic feet of gas, at 37 lbs. per 1000 . .	388 lbs.
Coke	1456 „
Tar (10 gallons)	120 „
Liquor (25 gallons)	276 „
	2240 lbs.

Having, then, ascertained roughly the variation which will take place in the quantities of the different products, let us apply the two conditions of manufacture to the production of a certain fixed quantity of gas, and see what is the gain or otherwise per 1000 feet produced. It will not do to calculate directly upon the increased yield of gas per ton, for the reason that in supplying gas to the consumer, we have not the power to sell whatever quantity

of gas we are able to produce out of a given quantity of coal. Our business, on the contrary, is to supply a given quantity of gas, and to use as much coal as is necessary to produce that quantity. Hence it is a fallacy to take credit for 500 feet more gas per ton at the selling price of the gas, for, commercially, the true position of affairs is not that we sell so much gas per ton of coal, but that we use so much coal in producing the 1000 feet of gas which we sell. If, for instance, 10,000 feet of gas be sold per ton of coal, and the coal costs 14s. per ton, while the price of gas is 4s. per 1000 feet, then we expend 14s. in obtaining a return of 40s.; if only 9500 feet per ton be sold, then to sell 10,000 feet for which 40s. is received, we must use 1 ton 1 cwt. and nearly 6 lbs. of coal, which at 14s. per ton will cost roughly 14s. 9d. The saving effected is therefore not 2s., the selling price of 500 feet of gas, but 9d., as the reduced cost of the coal required to produce the sale of 10,000 feet of gas, and is equal to a saving of 0·9d. per 1000 feet sold.

To appreciate all the points in which a saving or a loss results from an increased yield of gas per ton, it is necessary to take a sufficiently large quantity of gas as the basis of calculation, and, from the cost of manufacturing this definite quantity, calculate the cost per 1000 feet. The following estimates of the cost of manufacturing 1 million feet of gas in 24 hours will, it is thought, be regarded as fairly correct. In the one case it is assumed that moderate heats are used and 10,000 feet produced to the ton; in the other, high heats are adopted, and the yield of gas is 10,500 feet to the ton. The use of cannel in these two instances is assumed to be unnecessary.

Estimate for 1 million feet of gas per diem, the make being 10,000 feet to the ton, the heats moderate, and the charges of six hours duration:—Coal carbonized = 100 tons; 28 settings of single retorts (7 each), or 14 of "throughs," will be required, and the charges of coal will be 2½ cwt. each. The make of gas per mouthpiece will be 5000 feet per diem; 18 stokers will be required on each shift, or 36 in all. The furnaces will consume 16 cwt. of coke each in 24 hours:—

100 tons of coal at 14s.			£70 0 0
Deduct residuals, as follows:—			
	Tons. Cwt.		
Coke produced . .	65 8		
Coke used as fuel .	22 8		
43 tons of coke, at 12s.		£25 16 0	
1076 gallons of tar, at 2d. . . .		8 18 0	
2500 gallons of 10-oz. liquor, at 60s. per 1000 gallons		7 10 0	
			42 4 0
Net cost of the coal			£27 16 0
36 stokers, at 4s. per day			7 4 0
Net cost of manufacture			£35 0 0
or 8·40d. per 1000 feet.			

Estimate for 1 million feet of gas per diem, the make being 10,500 feet to the ton, the heats high, and the charges of four hours duration:—Coal carbonized = 95 tons 5 cwt.; 22 settings of single retorts (7 each), or 11 "throughs," will require to be at work, and the charges of coal will be 2 cwt. each. The make of gas per mouthpiece will be 6500 feet of gas per diem; 15 stokers will be required on each shift, or 30 in all. The furnaces will consume 18 cwt. of coke each in 24 hours:—

95 tons 5 cwt. of coal, at 14s.			£66 10 0
Deduct residuals, as follows:—			
	Tons. Cwt.		
Coke produced . . .	61 18		
Less fuel used. . . .	19 6		
42 tons 12 cwt. of coke, at 12s. .		£25 11 0	
950 gallons of tar, at 2d. . . .		7 18 0	
2250 gallons of 10-oz. liquor, at 60s. per 1000 gallons		6 16 0	
			40 5 0
Net cost of the coal			£26 5 0
30 stokers, at 4s. per day			6 0 0
Net cost of manufacture			£32 5 0
or 7·74d. per 1000 feet.			

These statements, if approximately correct, show that, with coal at 14s. per ton, by making 500 feet more gas to the ton, obtained by the adoption of high heats and short light charges, a gain of £2 15s. per million feet may be realized, which is equal in gas-works of the supposed size, making 200 millions a year, to £550 per annum, without allowing for saving in wear and tear and interest on plant.

If it be said that 10,500 of gas per ton is too high a yield to allow for without the use of cannel, the reply is that this depends upon the circumstances of the case, upon the kind of coal employed, the illuminating power required, and also, to some extent, upon the condensing and other apparatus in use on the works. If the increase be from 9500 to 10,000 feet to the ton, the proportionate gain is greater, the 500 feet in this case being an increase of 1-19th instead of 1-20th. In most cases perhaps more than 10,000 feet per ton cannot safely be obtained without having recourse to cannel. The percentage of cannel necessary to maintain a certain illuminating power with a given make per ton is a fit subject for careful experiment, such as it is presumed Mr. Livesey intends to carry out.

The following estimate for 1 million feet of gas with an average make of 10,500 feet is based on the assumption that 5 per cent. of Wigan cannel, at 28s. per ton, is required to maintain the illuminating power:—

90 tons 10 cwt. of coal, at 14s.		£63 7 0
4 „ 15 „ cannel, at 28s.		6 13 0
95 tons 5 cwt.		£70 0 0
Deduct residuals as in Example II.		40 5 0
		£29 15 0
Wages of 30 stokers		6 0 0
		£35 15 0

The gross cost of the coal is in this case exactly the same as in the first estimate. There is a saving in labour of about 2d. per ton, but this does not compensate for the loss in the receipts for residuals, and the balance is 15s. on the wrong side for 1 million feet of gas. There will, however, be a saving in wear and tear, although to what extent the writer is not prepared to state; but as the saving in plant with the use of high heats is 20 per cent., it would be absurd to suppose the wear and tear of the retorts to increase in the same proportion. In fact, a very much less increase in the productive capacity of the retorts has, in the writer's experience, resulted in a saving under this head, and the fears entertained by some on the score of the expense of renewing the retorts seems quite unintelligible. Under the head of interest on plant a saving of 20 per cent. will be gained, not 5 per cent., as Mr. Livesey calculates, for it is not in proportion to the increased make per ton, but to the productive power of the retorts that a saving in this direction is to be looked for. Assuming a retort-house and retorts complete capable of making 1 million feet of gas per day, to cost £10,000, we shall have a saving of £2000 in capital, equal at 10 per cent. interest to £200 per annum.

It will be seen that so long as an increased yield of gas per ton does not necessitate an increase in the cost of the coal, by the addition of cannel, it will always pay to work with high heats, and obtain a large yield of gas per ton, unless, indeed, the value of the residuals were to exceed the cost of the coal; but so long as these only defray a portion of the cost of the coal, a saving in the coal must be identical with a saving in the cost price of the gas, on the principle that the value of the whole is greater than the value of a part. The selling price of the gas has, however, nothing whatever to do with the question, it being one of cost of production alone.

It is very much to be desired that careful experiments should be made to determine what coals will bear distillation at a high heat and produce a large yield of gas per ton with economy. In this direction information is wanted. The economical limit of production will, without doubt, vary with the different quality of the coal, and it is to the quality and cost of the coal that we must look for guidance in deciding the policy to be adopted in carbonization. Increased consumption of fuel, cost of wear and tear, and other evils, *may* be attendant on the adoption of high heats, but are not necessarily so. An increase of fuel for each retort furnace may take place, but may work out at a less percentage on the coal carbonized by getting additional work out of the retorts, and wear and tear, even if costing more per ton of coal, will not necessarily work out at an increased cost per 1000 feet of gas produced.

This, then, is the true basis of calculation: *The net cost per thousand feet of gas.* To this standard all profit and loss must be eventually reduced. It is a strange inconsistency which gives credit for the production of more gas per ton of coal, and consequently the use of *less* coal per unit of gas, and at the same time lays the burden of the expenses upon the coal, of which there is necessarily a smaller quantity over which to spread the cost of manufacture.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

THE ECONOMY OF CARBONIZATION.

SIR,—I am not anxious to prolong this controversy, and shall not, therefore, after this letter, trespass upon your space, unless it should be absolutely necessary to do so.

It appears from the letters that have been written upon the subject, that the supposed advantage of a high make of gas per ton of coal carbonized is not based on any actual experiments—no one seems to know how much the illuminating power is reduced by an increase of 5 per cent. in the volume of gas made; or the difference in the tar, either as to quantity or quality; or what extra amount of fuel is required; or whether higher heats produce a gas containing more carbonic oxide and the troublesome sulphur compounds, though this also is suspected. But it has been shown, I think, very clearly, that, whatever may be the exact cost or loss incurred by increasing the make from 9800 to 10,300 feet of gas per ton, the additional 500 feet is not worth what it costs. On this point Mr. Gandon's calculation is valuable and interesting, arriving at the same conclusion from an entirely distinct method of stating the case.

As the *selling* price of the gas is sometimes taken as the basis of the calculation, the following explanation may be useful:—Taking the case published a week or two ago, where, in order to make 10,300 feet of gas per ton, 6 per cent. of cannel is required to keep up the illuminating power—this cannel raising the price of the coals 1s. per ton all round—the gain is stated as follows:—

The selling price of 500 feet of gas	2s. 0d.
Saving in labour	0 4
	2s. 4d.

or a gain of 1s. 4d. per ton.

The 4d. surely must be struck out, for it cannot cost 4d. less for labour to make 10,300 feet from a ton than 9800. The labour is expended upon the coal, and not upon the gas; the most, therefore, that can be claimed is that 10,300 feet can be produced at the same cost for retort-house labour as 9800 feet from a ton. If the extra gas is made, there can be no reduction in the amount paid for labour; but if the total quantity of gas remains the same while the quantity of coals is reduced, the saving on labour will be effected.

The effect of increasing the make per ton is really to reduce the quantity of coals used, as is the case when the leakage or unaccounted-for gas is reduced.

The total quantity of gas made must be governed by the consumption. Suppose, therefore, that 980,000 feet a day be required in the gas

holders, it would (at 9800 feet per ton) be produced by 100 tons of coal. Then let the make per ton be increased to 10,300 feet—producing from the 100 tons 1,030,000, or 50,000 feet beyond the requirement—the manager would at once reduce the quantity of coal by 5 tons, thereby saving 5 tons of coal and the labour that would be expended upon them, a trifle in interest on plant, and no more.

The ordinary coals without cannel cost, say 13s. 3d. per ton; deduct from this the value of the products, which should be at least 50 per cent., but say 40 per cent., or 5s. 3d., leaving 8s. as the net cost of coal, we then have—

5 tons of coal saved, at 8s. per ton	£2	0
Carbonizing labour on the same, according to Mr. Field	0	15
	£215	
Cost at which this saving is effected, 1s. per ton on 100 tons, or an addition of 12½ per cent. to the net cost of the coal all round for 5 per cent. increase of gas	5	0
Loss	£2	5

Without taking into account the extra fuel, loss on tar, wear and tear, &c., which greatly exceed the saving of interest on plant, it appears, if this method of stating the case is correct, that the extra 500 feet costs about double what it is worth. In other words, 1s. is paid to obtain a return of about 6d. Are any experiments really required after this?

GEORGE LIVESEY.

South Metropolitan Gas Company,
589, *Old Kent Road, S.E., Nov.* 6, 1880.

SIR,—The article from the pen of Mr. Livesey, on the "Carbonization of Coal," is one which brings to light an old subject, which had been laid aside as impenetrable. Why it should be so, never very clearly appeared to me; there surely must be some guide for the uninitiated—some plan for converting the poor benighted gas manager, who is "singeing his pate over the furnaces," and who, perhaps, has succeeded in obtaining the much-coveted 10,300 cubic feet of gas per ton of coal carbonized. If he has been working on a wrong basis, it is a pity so much valuable force should be either wasted or misapplied, for it must be admitted that to take 10,300 cubic feet of gas from a ton of Newcastle coal, both the manager and the man must bring to bear considerable exertion and physical application.

I am one of those peculiar individuals who have sprung from beyond the Tweed; and it is a fact that Scotchmen are great lovers of high heats, and believing that there is something fascinating about them, I hitherto have joined in chorus with my fellow-countrymen. But it is a very poor argument that one uses high heats simply because "so-and-so" does; rather bear in mind Mr. Stevenson's remark: "There should be a reason for everything;" and so I believe there is a reason for using high heats under certain conditions.

Reducing the question to one of figures, we will see how the case stands in regard to Bury St. Edmund's; and to facilitate the working out of the percentages, I have converted tons into pounds:—

Comparison.

2240·0 lbs. Newcastle coal, producing 9800 cubic feet of gas at a cost of	17s. 0d.	
2161·6 lbs. Newcastle coal, producing, at the rate of 10,300 cubic feet of gas per ton	9,939	cub. ft.
78·4 lbs. cannel, producing at the rate of 12,500 cubic feet of gas per ton	437	„
2240·0 lbs. of the mixture, producing	10,376	cub. ft.

Cost of the above.

2161·6 lbs. of coal, at 17s. per ton	16s.	4d.
78·4 lbs. of cannel, at 40s. per ton, nearly	1	5
2240·0 lbs. of the mixture costs	17s.	9d.

We have here a difference of 9d. per ton, to which add 2d. for the diminished value of the coke, and this gives us the first item in Mr. Livesey's estimate	0s.	11d.
Extra fuel	0	2
Less tar produced	0	0
Increased wear and tear of retorts and trouble with stopped pipes	0	1
	1s.	2d.
Deduct, as Mr. Livesey does		3d.
Difference	0s.	11d.

To produce 576 cubic feet extra per ton of coal costs 11d., and this quantity, less leakage (say 10 per cent.) is passed on to the consumers, yielding (at 4s. 2d. per 1000 feet), say, 2s. 1d.

The above is the extent to which we should be affected here; but is it not possible that the position of the gas-works may alter the case? For example, if we take a gas-works in the North, not very distant from the coal-fields, the case would then stand something like the following:—

Comparison.

2240·0 lbs. of common coal, producing 9800 cubic feet of gas, cost say	8s.	0d.
2161·6 lbs. of coal, at the rate of 8s. per ton.	7	8½
78·4 lbs. of cannel, at the rate of, say, 30s. per ton	1	0½
2240·0 lbs. of the mixture costs	8s.	9d.

Applying the same figures as before, we shall have a difference of 11d. per ton, which will realize from the consumer (gas at, say, 2s. 6d. per 1000 feet) say 1s. 3d.

In the former case a clear gain of 1s. 2d. was shown, in the latter only 4d. per ton; thus reducing the margin of profit to a very narrow limit indeed. This, in my opinion, is how every gas manager ought to settle the question. Let him work it out, bearing in mind the circumstances under which he is placed, and no doubt he will arrive at the proper decision.

You will observe that I make no allowance for reduction in the quantity of tar produced; there may be a slight decline in *quality*, but I do not think in *quantity*.

From the foregoing it will be seen that high heats act differently on the exchequer according to the position in which the works are situated. They are, therefore, not to be blindly applauded, neither are they to be entirely condemned.

It is strange, however, that in nearly all cases where a gas company's business or finances have got into a low state, it may easily be traced to low heats or mismanagement in the retort-house. I never heard of a case where high heats caused disaster or deficiency.

But ought there to be such a thing as "competition" "in make of gas per ton"? I think not, for any man who, merely for the sake of surpassing a brother in the profession, strives—fairly or unfairly—to obtain a greater quantity of gas per ton of coal, is seeking after popularity in a manner which cannot be too severely condemned. And, if it is the case that any one is stupidly satisfied that he is having a great make of gas per ton, when all the time he is using more coal than appears in his carbonizing book (and which accounts for his grand make), he is a fool to begin with, and must be shutting his eyes to the best interests of the company he professes to serve. I think it would be wise in all cases to ascertain exactly the stock of coal, both at the beginning and end of the financial year; if for no other purpose than to be a check on weighing the coal into the retort-house. Many gas managers lapse into a state of indifference regarding this and other items in their working accounts, contenting themselves with the miserable assurance that because their works are small the results are "good enough." There could not be a greater mistake. What is necessary in the largest works is necessary in all works—the one principle applies in every case, and the only difference is one of degree.

I, with many others, shall look with interest for the result of Mr. Livesey's experiments, knowing, as every one does, that what this gentleman puts his hand to do he will do thoroughly.

Bury St. Edmund's Gas-Works, Oct. 30, 1880. JOHN M'CRAE.

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

FRIDAY, NOV. 5.

(*Before Vice-Chancellor* HALL.)

In re ST. PETERSBURG NEW WATER-WORKS COMPANY, LIMITED.

Mr. GRAHAM HASTINGS, Q.C., appeared in this case, and reminded his lordship that the petition had stood over on the 23rd of July last, it being a petition by a creditor to wind up the Company. The Company, he said, was a good one; but was short of funds, and the parties contemplated a resuscitation upon terms which would enable the debenture holders to have fresh debentures. The Company had undertaken not to consent to any order to wind up between July last and the present time. A scheme had now nearly been matured for the reconstruction of the Company, and it was desired, therefore, to take a winding-up order, and appoint for liquidators Messrs. Guiness and Western, who were two members of the committee of debenture-holders. As soon as this was done, an application would be made under the Act for the sanction of the Court to hold a meeting, which no doubt would result in a scheme that the Court would approve. He, therefore, only proposed now to take the usual winding-up order, and appoint the gentlemen named liquidators of the Company.

Mr. BORTHWICK, who appeared for the Company, did not raise any objection to the course suggested.

Order granted accordingly.

Miscellaneous News.

METROPOLIS WATER SUPPLY.

MEETING OF VESTRY DELEGATES.

The Adjourned Meeting of the Delegates from the Vestries and District Boards of the Metropolis, convened to consider the London Water Question, was held last Wednesday, in the St. Martin's Vestry Hall—Mr. E. J. WATHERSTON again presiding.

After some introductory remarks by the CHAIRMAN,

Mr. J. BEAL said he transmitted to the Home Secretary the resolution passed at the last meeting (see *ante*, p. 651), recommending that the Government should introduce a Bill constituting a Water Authority of a representative character; and had also addressed a communication to the Home Secretary asking whether parliamentary notices of such a Bill would be given by him, limited to such an object. To this the following reply had been received:—

Whitehall, Oct. 23, 1880.

Sir,—I am directed by the Secretary of State to acknowledge the receipt of your letter of the 20th inst., containing a copy of a resolution passed at a meeting of the Metropolitan Delegates on London Water Supply, inquiring whether Government intend to introduce a Bill, as recommended by the Committee, of Session 2, 1880, on London Water Supply. I am to inform you, in reply, that Secretary Sir William Harcourt will be glad to receive from the Delegates any representation on the subject, and will be glad to give any such representation his careful attention; but, in accordance with well-established practice, he must decline to answer questions as to the intended legislation of next session. (Signed) GODFREY LUSHINGTON.

To this, as there was no time to lose, the following letter had been sent on behalf of the conference, to Sir W. Harcourt:—

Sir,—I am in receipt of your communication of the 23rd of October inst., being your reply to a resolution of Delegates on the Metropolitan Water Supply, "inquiring whether Government intend to introduce a Bill as recommended by the Committee of Session 2, 1880."

In reference to the latter paragraph of your letter, in which you state that "in accordance with well-established practice, he (you) must decline to answer questions as to the intended legislation of next session," I desire to state that this is perfectly correct as to public Bills not requiring statutory notices. I acted as Honorary Secretary to Delegates of Vestries on Metropolitan Gas in 1857, 1858, 1859, and 1860, and again in 1867 and 1868, and on Water in 1870. Upon each of these occasions it was recognized that as some one must give the notices required by the Standing Orders of Parliament, we should be informed whether such notices would be given by the Government, in order that if the Government failed us we could take our own course as to advertising the notices.

As these notices must be inserted in the *Gazette* on or before the 15th of November, and in the event of the Government declining to do so, must be inserted in the interest of the ratepayers, either by Vestries or the Metropolitan Board, or the City Corporation, I have to ask you to consider the words which I have quoted in view of the parliamentary practice to which I have referred, and the precedents which I have quoted, and again referring to the resolution of the Delegates, whether notices will be given by the

Government, or whether you leave the Delegates or the Local Authorities of London to take their own course.

The only representation we desire to make at present is that, in view of legislation in the coming session, the Government will at the earliest moment inform us whether they will give the requisite parliamentary notices (without asking any expression of opinion as to the form they will assume in the Bill proposed), so that should they decline we may take such steps to secure legislation on this great question as we may be advised.

The Delegates will meet on Nov. 3 to consider your further reply, and no doubt will appoint, if you desire it, a deputation to wait upon you if that is the best mode of learning your decision.

You will note that, by the results arrived at at their last meeting, they simply ask whether you will give notice for a Bill to establish a Water Trust, the inference being that they will be content to leave to that body, when created, the dealing with, and settlement of all interests involved, and the future water supply of the Metropolis.

I shall esteem your early reply a favour. (Signed) JAMES BEAL.

He added that no reply had been received to this last communication.

Mr. BERRY then moved, and Mr. HAYES seconded—"That having received the reply of the Home Secretary, the delegates address themselves to the question of the proposed Water Trust.

Mr. MOTE moved as an amendment—"That a memorial be presented to the Home Secretary, embodying suggestions as to the proper course to be adopted with the view of an Act being passed for the acquisition of the undertakings of the various Water Companies; to provide for an efficient and economical supply of water to the Metropolis, for the creation of a Water Authority, and to carry out the work; and that a Sub-Committee be appointed to prepare such a memorial and bring up a draft for consideration."

Mr. PRATT seconded this amendment.

A long discussion then ensued; but ultimately the motion as proposed by Mr. Berry was carried with this portion of the amendment as a rider to it—"That a Sub-Committee be appointed to prepare suggestions in reply to the Home Secretary's request, and to bring up a report for consideration."

A Committee of seven was appointed, and the meeting adjourned till to-morrow, the intention being to offer these suggestions to the Government before the expiration of the time for parliamentary notices to be given.

[Since the meeting the following reply to his letter, published above, has been received by Mr. Beal:—"Whitehall, Nov. 3, 1880.—Sir,—I am directed by the Secretary of State to acknowledge the receipt of your letter of the 28th ult., again pressing for information as to the intentions of Her Majesty's Government with regard to legislation in the next session of Parliament on the subject of the Metropolitan Water Supply; and I am to refer you to the answer given by the Earl of Fife, on the part of the Government, in the House of Lords on the 16th of August last, in reply to a question on the same subject. (Signed) Godfrey Lushington."]

COURT OF COMMON COUNCIL.—At last Thursday's meeting of the Court, Mr. P. Morrison's motion—"That it be referred to the Gas and Water Committee to consider the advisability of offering a substantial premium or premiums to engineers and others for the best plan or mode of supplying the City or the Metropolis with water, having especial regard to sufficiency, quality, and economy, and to report thereon fully to this Court"—to which reference has already been made in the JOURNAL, was agreed to.

The following are the returns made by Dr. C. Meymott Tidy, on the Composition and Quality of the Metropolitan Waters in October, 1880:—

[The results are stated in grains per Imperial gallon of 70,000 grains.]

NAMES OF WATER COMPANIES.	Total Solid Matter.	Oxygen required by Organic Matter, &c.	Nitrogen. — As Nitrates, &c.	Ammonia.	Hardness (Clark's Scale).	
					Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	22·13	0·064	0·135	0·000	15·4	2·4
West Middlesex	21·57	0·040	0·115	0·002	15·4	2·4
Southwark and Vauxhall	22·14	0·080	0·104	0·000	14·8	3·0
Chelsea	21·63	0·058	0·146	0·000	14·3	2·4
Lambeth	21·85	0·084	0·104	0·000	15·4	2·8
Other Companies.						
Kent	33·61	0·000	0·427	0·000	22·4	5·1
New River	21·39	0·028	0·135	0·000	15·4	2·4
East London	22·64	0·064	0·146	0·000	16·5	2·4

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours.

The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, the West Middlesex Water Company.

SALE OF SHARES IN THE NEW RIVER COMPANY.

A large number of stockbrokers and capitalists attended at the Auction Mart, Tokenhouse Yard, E.C., on Wednesday last, when Messrs. Edwin Fox and Bousfield offered for sale by auction some fractional portions of the original stock of the New River Company, as well as a few new shares in this important water undertaking. The portions of the original stock submitted for sale consisted of the tenth of a share in the King's Moiety, and the eighth of a share in the Adventurers Moiety, these being, as is now generally known, the two classes into which the 72 original shares in the Company are divided. Any portion of an original share is real estate, and confers upon its possessor parliamentary franchise for the counties of Hertford and Middlesex. The new shares are of recent creation, and are of the nominal value of £100. They rank *pari passu* with the original shares, but do not confer any voting powers.

Mr. E. H. BOUSFIELD, in opening the sale, briefly referred to the exceptionally good position of the New River Company among the water undertakings of the Metropolis, and called special attention to the fact that during the past 16 years the income had more than doubled, while the future of the concern could not, he said, fail to be one of increasing prosperity. Whatever action might eventually be taken in reference to the Water Supply of the Metropolis, the Shareholders in the New River Company must be amply compensated for their property if it were taken over by some Trust, and even then there would still remain the Company's vast landed estates, of which the 50 acres in Clerkenwell alone would, putting the lowest price upon them, represent the entire paid-up capital of the undertaking. Such facts as these were, he thought, sufficient recommendations of the property for which he would proceed to ask for biddings.

The portion of the Adventurers Share was the first put up. It was divided into 15 lots, each representing the 120th part of the entire share, and the proportion of dividend payable at Midsummer last in respect of each lot was £19 18s. The first lot was sold for £790, being at the rate of £94,800 for the complete share, and the same price was realized for lots 12 to 15; five of the other lots were knocked down at £785 each, and the other five at £780 each. The tenth part of a King's share was then offered, in 10 lots, six of which were sold for £910 each, two for £900 each, and two for £895 each. The new shares came next, and of these there were 30. The dividend on these shares at Midsummer last was at the rate of £11 1s. 6d. per annum. Six of the shares fetched £380 each; sixteen, £375 each; and eight, £370 each. The fractional portion of the Adventurers share submitted for sale realized £11,775; the portion of the King's share, £9050; the 30 new shares, £11,240; making a total of £32,065 as the proceeds of the sale.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Ordinary Half-Yearly Meeting of this Association was held at the City Terminus Hotel, Cannon Street, E.C., on Tuesday, the 2nd inst.—Sir JULIAN GOLDSMID, Bart., in the chair.

The SECRETARY (Mr. R. S. Gardiner) read the notice convening the meeting, and the following report:—

The present half-yearly ordinary meeting of the Proprietors has been convened, in conformity with the Company's Act of Parliament, for the purpose of receiving a report from the President and Directors upon the affairs of the Association, and for declaring a dividend for the half year ended June 30, 1880.

The following figures show the result of the workings at all the stations, including all those in France:—

Gas Made.—The quantity of gas made in the half year ended the 30th of June last was 2807 million cubic feet; the quantity made in the corresponding half year of 1879 was 2701 million cubic feet; showing an increase of 106 million cubic feet, or at the rate of 3·92 per cent.

Lights.—The total number of lights on the 30th of June last was 1,282,984; the number on June 30, 1879, was 1,249,177. These figures give an increase of 33,807 lights, or at the rate of 2·7 per cent.

Mains.—The length of mains laid on the 30th of June last was 1273 miles; the length of mains laid at the close of the corresponding half year of 1879 was 1256 miles; being an increase of 17 miles.

Rental and Profit.—The rental for the half year now under review exceeded that of the corresponding half year of 1879, and there was also a slight increase in the profit.

Coal.—A comparison of the cost of the coal employed during the half year, with that of the coal used in the corresponding half year of 1879, shows a reduction of not quite 2d. per ton.

Secondary Products.—The values of the coke, tar, and ammoniacal products have advanced during the period under review. Every attention has been paid to the improved treatment of residuals, and a tar distillery is in course of erection on the works at Forest, Brussels.

General.—The plant at all the stations was maintained in a proper state of efficiency at a reasonable cost. The expenditure on the usual extension and enlargement of mains was moderate.

At Vienna two scrubbers were erected on the Währing works, and the works at Tabor received a new condenser. A gasholder-tank and house for the gasholder were built on the Erdberg works. The Baumgarten works were put in action.

Progress was made with the alterations and improvements which are requisite at the new French stations. Land for the enlargement of the works was purchased at Armentières and at Evreux, and a new gasholder was erected at Estaires.

The President and Directors have to announce the purchase on the 29th of June last of the gas-works at Flushing, from the Municipality of that town, with whom a contract has been concluded for a period of 30 years.

The Proprietors are aware of all the events which led to the contract for the public lighting at Ghent being given to the Société Financière. Last April the Municipality served the Association with notice to discontinue the manufacture of gas upon the expiration of their contract on the 1st of July, 1881, and to remove their mains. The Association replied to this notice by again asserting their right to continue to supply gas to private consumers in accordance with their original powers, and their intention, of course, to exercise that right. A suit has in consequence been commenced between the Municipality and the Association, and the preliminary pleadings have been delivered.

It is now the duty of the President and Directors to record the lamented decease of their colleague and late Chairman, Mr. Philip Twells, who was a Director of the Association for 23 years, and constantly took an active part in all that concerned its welfare. The vacancy thus created on the Board has been filled by the election of Mr. Arthur Lucas, C.E.

It is also with much regret that the President and Directors report the death of Mr. Kenelm Digby Wingfield, who, during his brief connection with the Association, fulfilled the duties of Travelling Inspector with much tact and ability. Mr. Herbert Valentine Lindon has been appointed as his successor.

The President and Directors desire, in conclusion, to draw the attention of the Proprietors to the accounts for the half year ended the 30th of June last. These have been duly audited, and from them the Directors have, in accordance with the provisions of the Companies Clauses Consolidation Act, prepared a scheme showing the profit of the Association for the half year, and the portion thereof applicable to the purposes of dividend which the President and Directors recommend now to be declared—namely, a dividend of 5 per cent. for the half year ended the 30th of June last, and a bonus of 1 per cent., payable free of income-tax on and after the 1st day of December next.

The PRESIDENT: The report which you have heard speaks for itself. The affairs of the Association are conducted, as you know, on a principle which has been approved by the Proprietors for many years past. We have endeavoured, as far as possible, to maintain the value of our property, and at the same time to treat fairly our consumers in all parts of the Continent. I told the Proprietors at our last meeting that the Board of Directors endeavoured, as opportunity arose, to add to the field of their occupation by purchasing other gas-works, and that we had then negotiations going on regarding such a purchase. I could not, however, give further particulars then, because it might have interfered with the bringing of those negotiations to a satisfactory conclusion; but we are now able to announce that we have purchased the gas-works of the rising town of Flushing. We have made a very fair contract with the Municipality, who have properly, I think, looked after the interests of the public, but at the same time have fairly acknowledged the rights of the Association with whom they were dealing. I therefore desire, on the part of the Board, to express our sense of the honourable manner in which the whole arrangement for purchasing the works has been carried out through the Mayor and Municipality of Flushing. The statement in the report with regard to Ghent does not require any addition from me. I told you last time that the Directors were making some provision in case the lawsuit then pending should turn out wholly or partially unsuccessful, though we have every reason to believe that we are in the right; and this half year we have also set aside a moderate amount for the purpose. The new French stations are improving, as you have learnt from the report, and we hope in time they will be put in proper order, as well as the Flushing works, which at present require a considerable amount of attention. One of the French stations—Meaux, near Paris—was the only one where the contract was about to expire; but I am happy to say that we have recently, since the date of the report—we always like to tell the Proprietors anything occurring in the interval between the date of the report and the meeting—been able to make a satisfactory contract with the town for 30 years. There is a very small station, which probably none of you have ever heard of, which was included in the purchase we made of the Gautier works; and as we had an offer for it we have sold it. This has also occurred since the date of the report. Then there is one matter that concerns us all, which I think is very satisfactory. We have, under our Act of Parliament, the right to hold our meetings in the months of May and November—the Act does not specify the exact date; and we found we could close our accounts rather earlier, owing to the better communication we now have with all parts of the Continent and recent arrangements in our financial department. We therefore now for the first time hold the meeting earlier, and propose to pay the dividend a fortnight sooner than before, and we hope to continue to do this each half year in future. The only other matter I wish to refer to is a subject I mentioned at our last meeting—the death of Mr. Twells. The Directors were all very sorry to lose his active concurrence and exertions in the management of

the affairs of the Association; but we have endeavoured to supply his place in a suitable manner. As at a Board like ours is, where a large number of technical details have constantly to be considered, it is of great advantage to have civil engineering talent, we have elected as a Director Mr. Arthur Lucas, C.E., who we hope in time will be a very valuable member indeed of our Board. As I stated at our last half-yearly meeting, we have filled Mr. Wingfield's place by the selection of Mr. Lindon, and the appointment has given entire satisfaction to the Directors, and Mr. Lindon has shown the greatest capacity for the work he has had to undertake. There is very little difference in the profit made between this and last half year, and the Directors propose to declare the same dividend and bonus. As I have often previously told you, we do not like to see rapid fluctuations. If we take a step in advance, which we are always glad to do, we like to maintain it, and I think you will agree that this has always been done. I now move—"That the report upon the affairs of the Association be received and entered on the minutes."

The DEPUTY-CHAIRMAN (Mr. H. Wood) seconded the motion, and it was carried unanimously.

On the motion of the DEPUTY-CHAIRMAN, seconded by Mr. F. BASSETT, the dividends recommended in the report were unanimously declared.

Mr. A. J. DUFF FILER moved a vote of thanks to the Directors for the manner in which they had conducted the affairs of the Association.

The motion was seconded, and unanimously agreed to.

The DEPUTY-CHAIRMAN: At the Chairman's request I beg to acknowledge, on his part and the part of my colleagues and myself, your kindness in continuing to us your confidence. I can only say that no exertion shall be wanting on our part to carry on the business of this great corporation in the efficient way we have hitherto been allowed to do. I have now to propose that our thanks be given to Mr. L. G. Drory and to the Agents, Engineers, and Officers of the Association, for their very able management and fulfilment of the duties entrusted to them. We can speak most highly of them all, and I have very great pleasure in proposing this vote.

Colonel WILKINSON seconded the motion, which was carried unanimously.

The proceedings then terminated.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly General Meeting of this Company was held at the London Offices, Idol Lane, E.C., on Thursday, the 4th inst.—EDWARD HORNER, Esq., in the chair.

The SECRETARY (Mr. Alfred J. Head) read the notice convening the meeting, and the following report was taken as read:—

The Directors herewith present the statement of accounts for the half year ending June 30, 1880.

The half year's working has resulted in a profit of £6814 16s. 5d., making with the balance brought forward from the last account £7222 13s. 8d. There has been written off from preliminary expenses, £1614 17s. 3d. The Directors recommend the usual dividend on the preference capital, and a dividend at the rate of 6 per cent. per annum (free of income-tax) on the ordinary shares, which will absorb £5200; leaving to carry forward, £407 16s. 5d.

The Directors retiring by rotation are Mr. Joseph Quick and Mr. Horatio Brothers, and the Auditor retiring is Mr. Magnus Ohren, who, being eligible, offer themselves for re-election.

Balance-Sheet, June 30, 1880.

Dr.				Cr.			
Capital—				Investment to Dec 31, 1879			
5000 ordinary shares	£100,000	0	0	Less depreciation of lamp services	120	0	0
1000 10 per cent. preference shares	20,000	0	0		£109,956	4	9
1500 7½ do. do.	30,000	0	0	Concession	7,000	0	0
Debentures	2,650	0	0	Meters fixed	2,347	1	10
Creditors—				Office furniture and fixtures	296	6	6
On open accounts	624	10	8	Preliminary expenses	15,300	0	0
On acceptances	110	0	0	Amount due for gas, fittings, &c.	9,955	0	2
Dividends unpaid	32	13	1	Stock of coals, coke, &c.	11,687	18	8
Debenture interest	77	16	10	Goods in transit	445	19	9
Insurance-fund	47	4	10	Bills receivable	3,900	0	0
Reserve-fund	2,500	0	0	Cash at Bankers—			
Profit and loss	5,607	16	5	General account	204	2	3
				Dividend account	110	9	11
				London office	10	0	2
				London and Brazilian Bank	156	5	9
				Bahia office	280	3	1
	£161,650	1	10		£161,650	1	10

Revenue Account, for the Half Year ending June 30, 1880.

Coals carbonized	£5,465	16	6	Gas supplied to—			
Purifying materials and wages	200	3	1	Public lamps	£9,844	3	2
Carbonizing wages	1,088	5	1	Less fines	202	13	8
Wages, yardsmen, &c.	241	14	6		£9,641	9	6
Repairs, &c., mains and services	585	18	10	Private consumers	6,783	2	1
Lighting and repairing public lamps	1,104	4	8	Public establishments	971	15	11
Salaries	1,842	9	7	Meter-rental	563	8	3
Directors fees	400	0	0	Products £2,469 3 0			
Auditors fees	21	0	0	Less labour 80 16 11			
Rent and taxes	201	7	6		2,388	6	1
Interest and discount	49	13	0	Transfer fees	6	3	6
Stationery	52	5	10	Profit on fittings	249	2	1
Office expenses	17	5	7	Bad debts recovered	10	18	7
Trade charges	136	13	10				
Travelling expenses	33	15	0				
Wear and tear	1,048	17	7				
Bad debts and allowances	353	15	4				
Exchange	937	6	4				
Law charges	18	17	4				
Preliminary expenses—amount written off	1,614	17	3				
Balance, being net profit for the half year	5,199	19	2				
	£20,614	6	0		£20,614	6	0

Profit and Loss Account.

Dividends declared May 20, 1880	£4,625	0	0	Balance, Dec. 31, 1879	£5,164	8	11
Income-tax upon ordinary shares	52	1	8	Revenue account, profit for the half year	5,199	19	2
Debenture interest to the 30th of June	79	10	0				
Balance	5,607	16	5				
	£10,364	8	1		£10,364	8	1

The CHAIRMAN, in moving the adoption of the report and accounts, said the features of the Company were in many respects not very different from what they were at the last meeting, excepting so far as he thought they might be considered favourable. Turning to the balance-sheet, the Shareholders would see that the item of acceptances stood at only £110, whereas in June, 1879, the amount was £5308, and in the last account it stood at £2080. This, he thought, was somewhat of a healthy feature, showing that the Company were able to pay their way without resorting to other modes of raising money. On the other side of the account the Shareholders would see that the Directors had dealt with the preliminary expenses. He mentioned on a former occasion that there were certain items in the accounts which appeared as assets, and which had, of course, been paid, but which really represented nothing at all; and he then stated that in prudence the Company ought to try and get rid of them. In the present accounts it would accordingly be seen that £1614 had been written off preliminary expenses. With regard to the Company's trading, the amount remained singularly similar to what it had been for a long time. He wished they could see their way to do something which would induce the consumption of gas on a larger scale. In such an extensive city as Bahia, he thought the private consumption ought not to stand still, as it had done for some time. He considered this was one of the worst features of the Company's business—that the consumption did not increase anything like so much as the Directors could wish. No doubt a high price had to be charged for gas, and the competition of petroleum prevented the gas consumption from being so large as it otherwise might be; but for his own part he would rather make some little sacrifice in order to effect an increase in the private consumption. It was a matter which the Shareholders might be quite sure engaged the attention of the Directors very much. It was a difficult problem, but now that the Company were in a fairly good position, he thought they must look it in the face some way or another. The quantity of coals consumed showed a difference of but a few tons as compared with December last, and was only about 50 or 60 tons more than in the previous June; but the receipts per ton of coal for the half year ending this June were about 3s. more than in December, being 118s. 6d. against 115s. 6d. and 112s. 9d. in June last year, so that on the whole this was very satisfactory. The coals had cost a little extra, but he believed that freights had been rather more, and he was afraid that freight all over the world was more likely to increase than diminish. If trade really continued to improve, it must affect freight, and would have some little effect on the Company's accounts, but as they had a tolerably good margin for this, he did not think they would receive much injury. The worst feature in the accounts was the matter of exchange. The Company were still sufferers by the exchange, having lost £937 last half year by it. Their last exchange was only 23½d., instead of 27d., which was a very serious thing. They, however, had no control over this matter, but he hoped things would eventually right themselves, and in this case the Company would derive considerable benefit. The loss on exchange came to very nearly 1 per cent. in the half year, and more than 1 per cent. in the year. On the other side of the account the items were all very similar—there was a slight reduction in the private consumption and public lamps, but the amount altogether was only £305. The profit on fittings was also less. He thought, on the whole, the accounts were satisfactory, and the profit the Company had made they had in hand. This showed that if the dividend had not very much increased, the Company were in a sound position. They had been able to increase it by 1 per cent., to write off the sum mentioned from the preliminary expenses, and to carry forward a small balance.

The DEPUTY-CHAIRMAN (Mr. H. Brothers) seconded the motion, and it was carried unanimously.

The CHAIRMAN then moved that the maximum dividends on the 10 and 7½ per cent. preference shares, less income-tax, and a dividend at the rate of 6 per cent. per annum, free of income-tax, on the ordinary capital of the Company, be declared.

Mr. MAGNUS OHREN seconded the motion, which was carried.

The retiring Directors and Auditor were then severally re-elected.

Mr. LINGING referred to the balance-sheet as an evidence of the prosperous position to which the Company had been brought, and said he did not think the Chairman had done justice to himself and the Directors in the remarks he had made. The present condition of the Company must have entailed a large amount of labour, and he thought the Shareholders were very much indebted to the Directors. Till the present Board joined, the Company passed through nothing but evil times, and when they joined it they found it in a slough of despond. He considered under the circumstances that there was something more due to the Directors besides the customary vote of thanks. He therefore moved that the remuneration of the Directors be raised from the 1st of July to £1200 a year. It was also to be remembered that for three half years the present Directors had not received any pay at all.

Mr. ANDREWS, in seconding the motion, fully endorsed the remarks of Mr. Linging.

The motion was carried unanimously.

The CHAIRMAN, in replying, expressed the thanks of his colleagues and himself. Reference had been made to his modest statement with regard to the Company's affairs, but as long as he had been chairman of a company it had been his practice never to say anything which he thought would hold out expectations that might possibly not be realized. He thought too much credit had been given to the Board for what they had done, for he believed that the nature of circumstances had greatly brought about what had happened. No doubt there was a time when the leakage, among other matters, caused the Directors great anxiety, but they had succeeded in reducing it, and to this fact was, in great measure, attributable the Company's present improved position. The Secretary had received a letter from the Engineer (Mr. Muriel), who stated that he had no doubt the affairs of the Company would in the future be as satisfactory as they were at present, and he also talked about there being more dividend. However, the accounts spoke for themselves, and he only hoped the Company might be able to pay an increased dividend. The Directors had acted on a safe principle in conducting the Company's affairs and dealing with the funds at their disposal.

The DEPUTY-CHAIRMAN said the Board were highly pleased with the way in which Mr. Muriel conducted the Company's business, and the excellent carbonizing returns he now made. He (the Deputy-Chairman) saw nothing to prevent the Shareholders receiving a higher dividend, and he should say that the limit ought not to be less than 10 per cent. He moved that the best thanks of the meeting be given to Mr. Muriel.

Mr. FINLAY seconded the motion, and it was carried unanimously.

Mr. ANDREWS next moved, and Mr. KENT seconded, a vote of thanks to the Chairman and Directors, and the resolution was carried unanimously.

The CHAIRMAN briefly acknowledged the compliment.

A vote of thanks was then passed to the Secretary, and the proceedings terminated.

THE WATER SUPPLY AND SEWERAGE OF WHITCHURCH.—At a meeting of the Whitchurch Local Board, on the 3rd inst., it was unanimously decided to at once proceed with a water-works and sewerage scheme, and to make application to the Local Government Board for their sanction to borrow for the purpose a sum not exceeding £10,000.

SALE OF GAS SHARES AT HULL.—At a recent sale of gas shares at Hull the following prices were realized:—For 40 "A," 20 "B," and 20 "C" shares in the Sutton, Southcoates, and Drypool Gaslight Company, £10 paid up on each, £13 per share; for 40 "D" shares in the same Company, £4 paid up, £5 6s. per share; for 2 shares (£25) in the Kingston-upon-Hull Gaslight Company, Limited, £22 10s. paid up, £34 each.

MIDLAND ASSOCIATION OF GAS MANAGERS.

At the close of the conversation which followed Mr. Hunt's remarks on the subject of the comparative diffusive powers of square and circular lanterns, as reported in last week's JOURNAL, the reading and discussion of papers was proceeded with.

Mr. G. E. STEVENSON (Peterborough) read the first paper, as follows:—

THE MANUFACTURE OF SULPHATE OF AMMONIA.

The residual products resulting from the manufacture of coal gas have during the last ten years received a much greater share of attention on the part of gas companies and of corporations having the gas supply in their hands than was formerly the case. One of the reasons for this is the increased value of the tar and the ammoniacal liquor—the tar on account of the development of the demand for tar products consequent on the discovery of the aniline dyes, and the liquor for the salts of ammonia into which it is now universally manufactured. At first those companies who had made long contracts for the sale of these residuals were well content to find, on the expiration of the contracts, that the value of the tar and of the liquor had increased enormously, tenders being in some cases made at a price more than double that of the former contract. In regard to tar, there are at present few gas makers who care to take upon themselves the risks and responsibilities attendant upon the distillation and the preparation of benzol and anthracene; while the further manipulation of these substances into the dyes of commerce is, I believe, in the hands of a comparatively small number of manufacturing chemists, who keep the practical part of the process as much as possible a secret from the world at large.

After a rapid rise, there has during the past two or three years been a diminution in the value of tar products, the supply appearing to have somewhat exceeded the demand, and the manufacture of these products has not of late yielded much profit. I am not aware that any gas company, with the exception of The Gaslight and Coke Company, has been found sufficiently venturous, during the last few years, to commence the working up of their tar themselves, the general impression being that an equally good profit may be made by the sale of the raw tar as by attempting to distil it on a small scale. The case is different in regard to the ammoniacal liquor. The working up of the liquor *in situ*, instead of selling it to private manufacturers, appears to advance hand in hand with improvements in scrubbing appliances, both springing from the desire to realize the utmost value from the source of profit which the ammonia existing in coal gas presents.

Whether the demand for ammoniacal salts will continue firm, in the face of a great increase in the production, is a question which cannot easily be decided. Although the price of sulphate of ammonia is partly regulated by that of nitrate of soda, the former appears to be gaining in favour as possessing its nitrogen in a better form for the treatment of the soil, and it seems probable that for this reason, and also because of the more extended use of artificial manures of all kinds, we shall not for many years see the production exceed the requirements of the market in regard to this article of commerce. However this may be, at the present time the ammoniacal liquor is a valuable residual of gas manufacture, and it has become a matter of considerable importance that its full value should be realized by the undertakings themselves, and that the profit derivable from it should not be allowed to pass into the hands of an intermediate class of manufacturers, especially as the production of sulphate of ammonia is no complicated process requiring special scientific knowledge or skill on the part of the manufacturer, nor necessarily attended by any risk or danger.

Although a price can sometimes be obtained for the liquor which will realize as much profit as if the liquor were worked up into salt, in most cases this is not so. The ammoniacal liquor, being bulky, its carriage is costly, whereas the manufactured salt, bearing a high value in comparison with its weight, can be delivered within any reasonable distance at a moderate expense. The position of the works in regard to the purchase of the acid required in the manufacture is a matter of importance, as this chiefly decides the question whether the manufacture of sulphate of ammonia may be profitably carried on or not. The apparatus to be used is a point worth careful study, and it is this that I desire chiefly to consider in my paper to-day.

It seems to have been at one time a prevailing opinion that any rough-and-ready method of procedure would do for this department of manufacturing chemistry. The great desideratum, it was supposed, was to have an apparatus as simple and as cheap as possible. Being a bye-product in a gas-works, upon which, at first, comparatively little depended, anything would do so long as the liquor was somehow or other worked up, and the salt got rid of. An old boiler was purchased and fixed along with a saturator of the roughest description. The liquor was put into the boiler, a certain quantity of lime added, and the whole boiled up till the ammonia had distilled over, when the fire was drawn, the boiler emptied, and the process commenced afresh. The saturator was a box with a moveable lid, and after the acid had been put in, the lid was adjusted, the fume-pipe connected to some chimney flue, and when the charge was neutralized the lid was removed and the salt got out. Fresh acid was from time to time added to the mother liquor as required, and it would often happen that the charge was saturated before the ammonia was worked off, in which case it was necessary to remove the lid, and introduce an additional supply of acid while the brewing was proceeding, at the imminent danger of suffocation from the ammonia and other vapours arising from the open saturator. The evils of this method of procedure could, of course, only be tolerated when the manufacture was in a very small way indeed. Various improvements were introduced, modifying these defects. A diaphragm was introduced into the saturator, cutting off that portion of it receiving the ammonia, and what is called the pocket saturator was formed. Other saturators had their lids fastened down, and a sliding shutter in the top or side to insert the acid and withdraw the salt. A second boiler has been in some cases introduced, and the liquor distilled by means of a perforated steam-pipe instead of by direct firing. In this form numerous appliances are existent at the present time, doing efficient work.

This system of manufacture, however, entails two evils which cannot be got rid of, except by an entire change of procedure. Firstly, the process is intermittent. The charge of liquor in the boiler must be worked off, run out, and a fresh supply put in before the distillation can be continued. Even if the boiler were fed with a constant supply of liquor, the stream of ammoniacal gas must be stopped while the saturator is emptied and charged afresh. All this implies loss of time, and the consequence is the apparatus must be designed of larger capacity for a given production of salt than would be necessary if the process were continuous.

The second evil is of more serious consequence. The ammoniacal salt being deposited in the saturator, the latter must of necessity be opened for the purpose of getting out the salt. In this lies a source of danger which has produced in gas-works alone, during the past two years, two disasters fatal to the lives of workmen employed. The danger arising from the possibility of opening the saturator during the distillation may be reduced to a minimum in the case of extensive plant where constant supervision is exercised. At Beckton, for instance, where the saturators are placed under a large shed open at both ends and well ventilated, the pocket saturators there used may perhaps blow with impunity, but in small works where men cannot be always watched, and where the space is confined, such an arrangement is often a fruitful cause of accident.

In order to obviate the necessity of interrupting the production of ammonia from the gas liquor, the method has been resorted to of passing the ammoniacal liquor through a column filled with coke, or other material calculated to divide up the liquor into fine streams, and subjecting it to the influence of steam introduced at the bottom of the column, by which means the ammonia is distilled out of the liquor as it passes through the column. The Coffey still also presents a ready and suitable contrivance for this purpose; the liquor flows backwards and forwards over a series of trays from the top to the bottom, and the steam passes upwards over the surface of the liquor. I am unable to state when either of these appliances was first made use of for distilling ammonia. The coke column is, I believe, favoured by many private manufacturers. It occupies a considerable space, and cannot, on account of its height, be conveniently placed under cover; otherwise it gives, I believe, satisfactory results.

The Coffey still is used of various forms and dimensions, and there appears to be a considerable difference in its efficiency according to the design. Some stills never take out all the ammonia from the liquor, and are consequently to be classed as defective examples of this appliance. The liquor must traverse a sufficient length of tray surface, must flow over the trays in a sufficiently thin stream, and must occupy a certain length of time in travelling from the top to the bottom of the still, otherwise the distillation will be imperfectly performed. If these considerations be fulfilled, I know of no better system of distilling ammoniacal liquor. To obviate the possibility of danger arising from opening the saturator, it is only necessary to have recourse to the evaporative process. If the acid be used in a concentrated condition, the salt will be deposited in the saturator, and must be removed in a solid form; but if the acid be diluted, the salt will remain in solution after the charge is neutralized, and will require evaporating to a sufficient degree of concentration before the salt will crystallize. If this plan be adopted, the saturator may be altogether closed, the acid being run in by a syphon-pipe from a tank, and the neutralized charge run off by an outlet-pipe at the bottom. When steps were taken three years ago to erect a sulphate of ammonia factory at the Peterborough Gas-Works, I decided upon adopting this plan, as presenting the maximum of safety and certainty in working, and as my experience of the working of the apparatus has been eminently satisfactory, I have thought that a description of it might be not without interest to some members of this Association.

The engraving (fig. 1) represents part of the building and the apparatus in plan; fig. 2 being the section. The factory proper is 26 feet square and 20 feet high to the springing of the rafters. The roof is constructed with a central square ventilator having louvres on all four sides. This and openings in the walls above head afford ample ventilation, which is further secured by air gratings round the floor line. Alongside the factory is a sulphate store, and the building also comprises a chemical laboratory conveniently situated for experiments connected with sulphate manufacture. The liquor is pumped from the tanks in the yard, by a Tangye's "Special" steam-pump, into a wrought-iron tank fixed on brackets against the wall of the building, at a sufficient height to admit of running the liquor into the still by gravitation. The still is represented in section in fig. 3 annexed. It is rectangular in form, and measures 4 ft. 6 in. by 3 ft., by 9 ft. long, and is constructed of ¼-inch cast-iron plates firmly bolted together with ½-inch bolts. The trays are made of wrought iron, No. 12 B. W. G. in thickness, and they are turned up at the edges ⅝-inch. They are separated by wood packing pieces bolted to the sides of the still. The spaces between the trays are only 3½ inches in depth—much less than is usual in the Coffey still, and herein lies greatly the secret of successful working. If the spaces were greater the steam would pass away without coming into intimate contact with the liquor. Additional height of still will not compensate for this, because the steam would lose its pressure in occupying the enlarged spaces, and the rush will be wanting which attacks and agitates the surface of the liquor. Although the still is only 9 feet high, the length of tray surface over which the liquor has to travel is 100 feet, and the liquor occupies ten minutes in passing from the top to the bottom of the still.

The steam enters at the bottom of the still, and along with the steam also the ammonia from the lime boiler, to which reference will be presently made. The ammonia and steam pass out by a 3-inch pipe from the top of the still to the saturators, of which there are two. These are rectangular boxes 5 ft. long by 3 ft. wide and 2 ft. 9 in. deep. The lids of the saturators are bolted down by six long tie-bolts passing through wood cross-bars at top and bottom. They are lined with lead from 6 to 12 lbs. weight per square foot. The acid, diluted in the proportion of 2 parts of water to 1 part of acid, is supplied from a tank at a convenient level for gravitating into the saturators. The charge for one saturator consists of two carboys, or about 3 cwt. of acid. The neutralized charges are drawn off from the saturators into a settling-tank, and from thence, after the impurities have been allowed to settle, are run into the evaporating pan. This is a flat wood tank, 6 ft. by 7 ft. in area, lined with lead and containing a coil pipe (1 inch diameter) through which steam is passed to boil up the liquor. The coil is arranged round the sides of the pan, and the salt falls into a clear space in the centre. It is afterwards shovelled out on to an inclined draining-table, and when dried thrown through a trap-door in the wall into the adjoining store.

As the prevention of nuisance from foul smells is an important thing where the works are situated in the neighbourhood of dwelling-houses, special means were taken to prevent the escape of any sulphurous fumes or ammoniacal vapour. The outlet-pipe conducting the waste gases from the saturators is carried round the building to a condenser situated outside, where any traces of ammonia are condensed along with the aqueous vapour, and the sulphuretted hydrogen is conveyed away by an underground pipe to the retort-house, where it is burnt in the main flue of the retort-settings, and passes out at the chimney as sulphurous acid.

It was found during the first year of working that the whole of the ammonia escaping from the saturator at the end of the charge was not recovered in the condenser. To remedy this a catch-box was inserted in the fume-pipe. This small box, 2 ft. long by 1 ft. 3 in. wide, is filled with dilute sulphuric acid, and the pipe from the saturator dips into the acid, and is perforated in the same manner as the saturator inlet-pipe, so that the waste gases must bubble through the acid before escaping. This effectually prevents any ammonia from being lost. The box is emptied into the settler when acid is neutralized, and fresh acid introduced by a funnel at the top. In starting the apparatus, the still is first heated by passing steam through it, after which the charge is run into the saturator, and the liquor turned on. The waste liquor issues by a cock at the bottom, and is run into a tank at the back of the factory. The steam and liquor supply must be regulated so as to get the maximum quantity of liquor without allowing any ammonia to escape at the bottom of the still.

When the apparatus was first designed, no provision was made for taking out the fixed ammonia from the waste liquor. During the past summer an arrangement was made for this purpose, as follows:—A plain cylindrical boiler was fixed at the back of the factory, and the waste

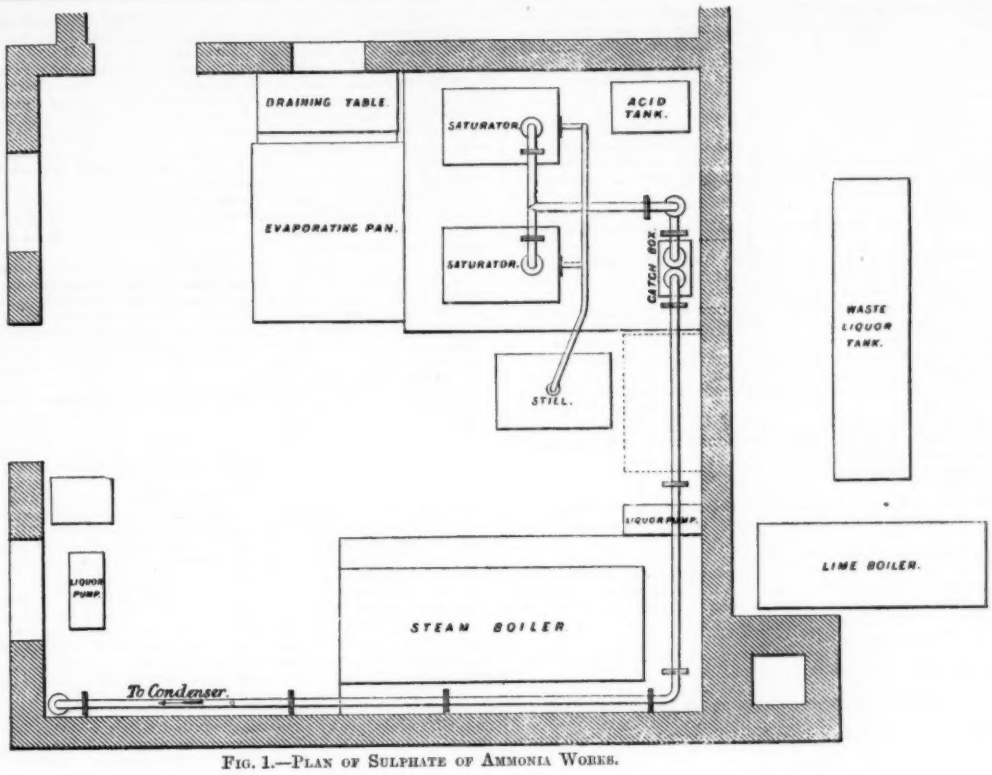


FIG. 1.—PLAN OF SULPHATE OF AMMONIA WORKS.

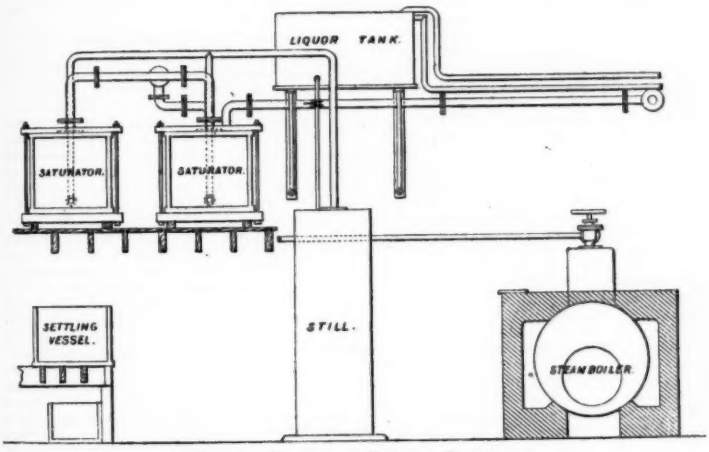


FIG. 2.—SECTION OF GENERAL PLANT.

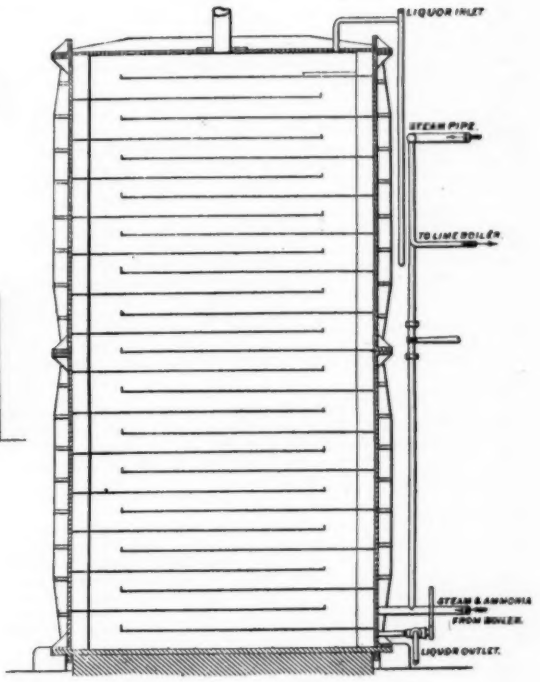


FIG. 3.—ENLARGED SECTION OF COFFEY STILL.

liquor is pumped into it alternately with milk of lime. Instead of passing the steam from the steam-boiler direct into the still, as formerly, it is first sent through a coil in the lime boiler to agitate the liquor, and from thence passes into the still, carrying with it the ammonia driven off from the waste liquor. This arrangement works satisfactorily, except that traces of ammonia are washed back by the liquor descending through the still, which causes part of the work to be done over again. To obviate this, I intend to have the steam and ammonia from the lime boiler introduced higher up in the still, and use an accessory steam supply at the bottom of the still to liberate any remaining ammonia which may be washed down.

With regard to the productive capacity of the apparatus, it is found that with liquor of 9-ounce strength the apparatus can easily make 3 tons of salt per week. Only one man is employed, who receives occasional assistance from a labourer. Without working overtime, the man in charge can work off five carboys a day on an average, the liquor being delivered through the still at a rate of about 150 gallons per hour. A charge occupies four hours in working off, so that 2¼ charges fall within one day's work. The evaporation of charges previously saturated goes on simultaneously with the distillation of the ammonia in the still. The factory is not worked at night, though this could, of course, be done if required. At present ten hours work per diem is more than sufficient for working up the whole of the liquor made, together with what can be purchased from small gas-works in the neighbourhood. After stopping work at the close of the day the boiler fire is banked up, and the steam-cock to the still left slightly open to keep the still warm. In the morning a very short time suffices to get up steam again and recommence work.

In concluding, I may express the hope that you will overlook the numerous defects in this paper. The subject is one upon which there is unusual difficulty in obtaining information as to what is done elsewhere, and I regret to say that, although I have asked for results from several gas-works, where apparatus differing from my own are in use, I have not been able to obtain anything which would justify me in drawing comparisons between the economical efficiency of the various descriptions of apparatus employed.

Discussion.

Mr. MORLAND: What is the cost of the apparatus?

Mr. STEVENSON said the whole expenditure on building and plant was about £1300; the building cost, he thought, rather more than half. If £600 were put down for the plant, exclusive of the building, it would be sufficient.

Mr. HUNT: I should like to know what becomes of the liquor after the ammonia is taken out of it.

Mr. STEVENSON: It is allowed to go down the drains; but no nuisance arises.

Mr. HUNT: What system of drainage is there at Peterborough?

Mr. STEVENSON said new main drainage had just been completed, and there was a sewage farm. The liquor did not go into the main drainage. There was surface drainage, and the liquor went into that.

Mr. NORTH: Into the river?

Mr. STEVENSON: Yes.

Mr. MORLAND: Have you ever ascertained what amount of fixed ammonia passes off with the liquor?

Mr. STEVENSON said before they used the lime boiler there was fixed ammonia to the extent of 1½ oz. There was no free ammonia.

Mr. HUNT: Is not the acid you use somewhat expensive—brimstone acid?

Mr. STEVENSON: No; I do not find it expensive.

Mr. WINSTANLEY: What is the strength of the liquor?

Mr. STEVENSON: 9 oz., and the specific gravity of the acid is 1725; but I have not tested it when diluted.

Mr. MORLAND said he had lately erected an apparatus on the tower principle for the manufacture of sulphate of ammonia. It had been worked

for some time, and they also treated it with lime, but the expense of the apparatus was not nearly so much as had been stated, perhaps not half, and he obtained very good results; in fact, he could, if they were working day and night, have two tons of sulphate made in 24 hours.

Mr. HUNT: What is your make compared with Mr. Stevenson's? How many tons of coal do you carbonize?

Mr. MORLAND: About 11,000 tons in the year.

Mr. STEVENSON: I use about half that quantity.

Mr. MORLAND said he intended to fill the tower with round pebbles, but could not get them—they were scarce in Gloucester—so he put broken bricks in. He thought pebbles would have been much better.

Mr. HUNT: Do you use lime?

Mr. MORLAND: Yes.

Mr. HUNT: Do you lose any ammonia at the outlet—does any pass away with the liquor?

Mr. MORLAND: Very little. The gases from the lime vessel pass up into the tower; the steam is first introduced as it is here.

Mr. STEVENSON: At the bottom of the tower?

Mr. MORLAND: Yes. One of the difficulties I had was getting rid of the waste liquor, and I arranged to run it back into the retort-house, and use it on the hot coke.

Mr. STEVENSON: I found that plan caused a great nuisance one winter, when we were short of water for slaking the coke.

Mr. MORLAND: It would if you were in the immediate neighbourhood of houses.

Mr. HUNT: How about the coke?

Mr. MORLAND: There is a slight smell. We do not use the waste liquor pure upon it; we use some clean water.

Mr. HUNT: Do you use it all that way?

Mr. MORLAND: Yes.

Mr. STEVENSON: What do you find the cost of labour per ton of salt?

Mr. MORLAND: I should think 5s. or 6s. for labour in manufacture alone.

Mr. STEVENSON: Per ton of salt, not more?

Mr. MORLAND: I could not say precisely, because we have not been working long, and not continuously. Perhaps it would be more. I calculate we should make about £13 clear profit per ton. What return do you get per ton of coal?

Mr. STEVENSON: 24 lbs. to the ton.

Mr. WOODALL: I know that many years ago, at Cheltenham, it was 34 lbs. I believe Mr. Paterson is now getting 34 lbs.

The PRESIDENT: That depends on the coal used.

Mr. STEVENSON: If all the ammonia is taken out of the gas, you can do nothing more.

Mr. DARWIN: We are selling our ammoniacal liquor at about 2s. 6d. per ton of coal.

Mr. MORLAND: What does the acid cost you?

Mr. STEVENSON: It costs £4 3s. 6d. without carriage. Carriage is 19s.

Mr. WOODALL: It might be worth while for Mr. Stevenson to know that it sells at £2 15s. at Leeds.

Mr. MORLAND: It is a question of carriage.

Mr. STEVENSON: I inquired at Sheffield, and found it would not suit; the strength was so low.

Mr. WOODALL: The Sheffield Company buy from Leeds.

Mr. PEATY said he did not see there was all the danger about the old method which seemed to be imagined. Supposing a curtain was used, there need not be any escape of gas. In his case they never let it blow. They keep a sufficient quantity of liquor in the vat itself, and it was perfectly safe. The charge could be drawn with safety to the workmen, and there were no offensive fumes. He thought there was no great objection to the ordinary saturators with curtains.

Mr. STEVENSON said he should like to know what was the fuel account in the other process. He used about 8 cwt. of coke per day with the boiler; it was so small comparatively that they could not use breeze.

Mr. MORLAND: In my case the liquor is heated before it gets to the top of the tower. I pass the waste gases and steam through the heater.

Mr. HUNT: What price does it realize, after allowing for labour and wear and tear, per ton of coal carbonized?

Mr. STEVENSON: The gross profit last year was £627 10s.

The PRESIDENT: Divide that by the tons of coal. What was the quantity of coal?

Mr. STEVENSON: 5000 tons.

Mr. HUNT: What quantity of liquor per ton of coal do you get?

Mr. STEVENSON: It was 22 gallons; now it is much more with the new scrubber, and the strength is 8 to 9 oz.

Mr. WOODALL: The profit you made—2s. 6d. per ton—was prior to taking out the whole of the ammonia from the gas?

Mr. STEVENSON: No; at the present time. Prior to that, only a very small sum was realized for the liquor.

Mr. WOODALL said that at Leeds they obtained 3s. 2d. where they manufactured their sulphate; but supposing they sold the quantity of liquor produced at these works under the most favourable contract they had in connection with other works, they would receive even more per ton of coal by selling the liquor. The process which they used let loose all the fixed ammonia. They did not realize this, but he was putting up a new apparatus, so looked to obtain 3s. 6d. per ton of coal, where they were having 3s. 2d. now.

Mr. HUNT: What quantity of liquor do you get per ton of coal?

Mr. WOODALL: 34 gallons of 11-oz. strength.

Mr. STEVENSON: What coals do you chiefly use?

Mr. WOODALL: Anything that comes in cheapest.

Mr. HUNT: Is that the gross return from the sale of sulphate?

Mr. WOODALL: Yes.

Mr. COLLETT: Not the net gain you would have by making your own sulphate as compared with selling the liquor.

Mr. WOODALL: The 3s. 2d. we realize is not debited with anything in the way of interest on plant, but the plant altogether would be dearly bought at £300, so it would not amount to much.

Mr. STEVENSON said that at Boston, where about 4500 tons of coal were carbonized per year, they had an elementary apparatus which cost £130, and he found the profit in the year came to about £300; but he did not think they took out all the ammonia. He found he was able to outsell them beyond their own place with the salt; for he had sent salt beyond Boston at a better price than they could get.

Mr. WOODALL said he was putting up works for the manufacture of liquor resulting from, say, 40,000 tons of coal per annum. His estimate was that it was to cost £700, including the conversion of an old gasholder into a house.

Mr. HUNT: What is your experience in dealing with sulphuretted hydrogen and waste liquor?

Mr. WOODALL: We let the sulphuretted hydrogen go into the boiler flue, and the waste liquor into the drains.

Mr. STEVENSON: I know a manufacturer who says labour costs him 30s. per ton of salt. Our expense is 24s. 6d. At the Crystal Palace District Gas-Works it costs about 22s. 6d. per ton for labour.

Mr. MORLAND: Is that labour in manufacture and packing?

Mr. STEVENSON: It includes in my case all the odds and ends.

Mr. WOODALL: Ours does not exceed 8s. per ton.

Mr. HUNT: That is a great difference.

Mr. NORTH said that so far as the Midland managers were concerned, he thought they had better sell their liquor. There was a certain amount of danger in the manufacture, and there was the labour and the capital to be employed, and he obtained better returns by selling the liquor. In the half year ending the 30th of June, his liquor realized 3s. 6·18d. per ton of coal carbonized, and 4·07d. per 1000 cubic feet of gas made. The average strength was over 5½° Twaddel. He thought when such results could be obtained, it was better to sell the liquor.

Mr. MORLAND: It depends on the position of the works. In our case it costs 6s. per ton to bring liquor into the neighbourhood of Birmingham.

Mr. NORTH: I do not say it applies to Gloucester, but in this district it seems the better course.

Mr. LAYTON: I anticipate making 2s. per ton of coal carbonized.

Mr. REEVES: I think we shall get 2s. 6d.; last year it was 2s. 3½d. We were calculating the cost of an apparatus, but if we can get the advanced price Mr. North does, it seems better to sell the liquor.

Mr. NORTH: Mine is a price that has been in force for two years.

Mr. STEVENSON: If you can get such results, you will not find any gain by manufacturing sulphate. Formerly, when I sent the liquor away, we received £120 a year for it.

A MEMBER said he obtained 16s. 3d. per ton for liquor of 5° Twaddel.

Mr. NORTH: I get 18s. 9d.

The discussion then closed.

Mr. H. WOODALL (Leeds) read the following paper:—

METER-RENTS.

He said: In submitting for your consideration a few remarks on meter-rents, I know I am entering upon very debateable ground. There is much that is most plausible to be said on either side of the question, and I am far from believing that justice and expediency always incline to the same. I shall, however, deal with the case as it presents itself to me.

At the first blush it appears anomalous that a separate charge should be made for measuring a commodity which we have for sale, and that the cost of the measurement should bear no proportion to the quantity measured. In one case the cost to the purchaser does not exceed 0·1d., as against 10d. in another instance—a difference of 100 to 1. Anomalous, no doubt, and very unfortunate for all concerned, buyer and seller alike, that it is so. And it is to be the more deplored, seeing that he is commonly the man of small means, who in this instance, as in most others, is placed at a disadvantage by comparison with the large user. The hardship is aggravated where, in addition to meter-rents, a differing charge is made for gas. But the fact that the large purchaser universally reaps an advantage over the small one may at least be cited in extenuation of the ordinary practice of a gas company. Let us see if there be not justification also for its procedure.

Not to take a very extreme case for an example, I will suppose that a customer burns 5000 feet of gas per annum, and that the charge is 2s. per 1000 feet. The income in such a case amounts to 10s. a year. What are the costs to the Company attending this sale? First, we have the main, which, taking blank spaces into account, will average not less than 7 yards to each customer; and will cost, with paving and reinstatement of road, 20s. A service-pipe will cost 7s. 6d., and meter connections 2s. 6d. Thus we have a capital expenditure, which may be directly incurred on account of the consumer under consideration, of 30s. Interest and depreciation on this item, calculated at 10 per cent., will amount to 3s. per annum. Next we have to consider the item of leakage; which being probably greater upon small mains than upon large, and entirely independent of the quantity of gas passing along the pipe, may fairly be charged at the average rate of loss per customer—*minus* a computation for loss by condensation in transit through the trunk mains. The average yearly loss per service-pipe is rarely less than 2500 feet. I shall therefore be within the mark if I assume the leakage on the main and service to be 2000 feet. The value of this in the gasholder I will take at 8d. per 1000 feet; so that leakage costs 1s. 4d. Again, in order to be well within the fact, I will charge the 5000 feet of gas consumed at the price in the holder—*i.e.*, 8d. per 1000—and this gives 3s. 4d. After this comes the inspection of meters and collectors calls, together ten calls per annum. I will suppose that ten calls can be made per hour, and that the joint pay of collector and inspector amounts to 1s. per hour, which again is understating the fact. Here we have a charge of 1s. per customer incurred quite independently of his consumption. Book-keeping and postage will be worth 3d., and bad debts will average 1d.

Thus we have charges incurred by a company supplying 5000 feet of gas per annum—cash out of pocket—of 9s. A meter may cost 20s., and interest and depreciation on this item at 10 per cent. would be 2s., which added to the previous total would give 11s., and show an absolute loss of 1s.

I trust you have not failed to observe that in my anxiety not to overstate the case, I have omitted to charge anything (commonly averaging from 1s. to 2s. per 1000 feet) for interest on plant, maintenance of mains, other than the small main immediately connected, or for management. On the other side, in giving the customer credit for a consumption of 5000 feet, I am treating the case in the same liberal spirit; for I find that at Leeds 10 per cent. of our customers pay us less than 10s. per annum.

Now, it is inevitable wherever the system of charging an uniform price is in vogue, and where, as at Leeds, no profit is sought to be realized, some portion of the custom must yield the exact cost, while other portions must result in profit and loss respectively. So that we must look to our largest and most lucrative customers to make good the losses incurred on account of the other section.

Is it rational or reasonable, under these circumstances, that any person should have it in his power to subject a company or corporation to an expenditure of capital on his behalf? Let him pay a meter-rent of 3s. per annum, and the loss of 1s. is converted into a gain of 2s.; and then, although he will still be indebted to other consumers, he may flatter himself that he is not an unreasonable burden upon the community.

If a man burns but 1000 feet of gas in the year at a price of 2s., and pays 3s. for meter-rent, he is as badly off, no doubt, as if 5s. per 1000 feet were the price of gas and no meter-rent was charged. But I have shown what a tax upon others such a customer is where one price is charged throughout; and, so far as he himself is concerned, his remedy is extremely simple. A gas company is proud when it can abate the price by a few coppers; but this man, using 1000 feet of gas, has only to burn five times as much to secure an abatement of 2s. 6d. per 1000 feet.

I have treated the subject in relation to a charge for gas of 2s. per 1000 feet. No doubt there may be expediency, in places where capital is high, in stimulating a sale under such conditions as I have dealt with; but even there the time may come when the evil will assert itself, and it is therefore better to begin as it is intended to proceed.

Meter-rents, in towns where the consumption of gas per customer is small, average about 2d. per 1000 feet. Their abolition would therefore necessitate an addition of a like sum to the price of gas; but the distribution of the amount would not be equable—one-half the public, burning

only one-fourth of the gas supply, would profit to the extent of half the gross income from meters, which would be a saving to them of 4d. per 1000 feet; the other half of the public, burning three-fourths of the gas supply, would profit to the extent of 1½d.; and so the imposition of 2d. per 1000 feet on the price of gas all round, in lieu of meter-rents, would inflict an extra tax upon the large and profitable consumer of ¾d. per 1000 feet.

This is certainly not the direction in which the interests of gas companies lie. It is manifestly to their best interests to sell gas in large quantities, and every abatement that can be made to the manufacturer is an inducement to him to apply it to new purposes; whereas in the other direction, the more restrictions are removed, the more unproductive becomes the field entered upon, until at length it becomes only a question of increasing loss.

Discussion.

Mr. HUNT said when he heard that Mr. Woodall had promised a paper for this meeting, he indulged in pleasing anticipations. Mr. Woodall had taught them to look to Leeds as the home, if not the fount, of economical principles as applied to gas supply, and his contempt of traditionary management was well pronounced. When, therefore, the subject of the paper was stated, he felt sure that the abolition of meter-rents was about to be advocated. Consequently, his surprise was great when he found Mr. Woodall not only defending what, in his (Mr. Hunt's) opinion, was one of the most indefensible of gas traditions, but resting his defence upon arguments that were, according to his (Mr. Hunt's) experience, of the most threadbare description. Mr. Woodall had brought before the meeting the time-honoured case of the small consumers. He had shown by his figures that they were burdensome to the large consumers, and adduced this fact as a reason why meter-rents should be charged. But then meter-rents were invariably levied upon the large and small consumers alike, without any regard to the amount of gas consumed. It was only by an accident that they pressed most heavily upon those who consumed the least quantity of gas. The figures Mr. Woodall had quoted were not by any means new. He (Mr. Hunt) very well recollected that a similar statement was prepared some years ago for the late Birmingham Gas Company. At that time he was half inclined to believe in them himself; and he did still believe in them to the extent that they seemed to justify a differential or a minimum charge for gas. But to impose such differential or minimum charge in the shape of meter-rents was a source of vexation to consumers and a hindrance to the proper conduct of the business of a gas undertaking. He was inclined also to doubt whether the small consumers were really so great a burden as they had been represented to be. Take, for example, the outlay for mains. Where the small consumers were located all in one part, then it became a matter of calculation as to how far it would pay to extend the mains on their behalf. Such cases were of not unfrequent occurrence in the outskirts of large towns, and every case as it arose would have to be decided upon its merits. But then it had to be remembered that a very large proportion of the small consumers were to be found scattered all over the most populous parts of the district, in which the mains had already been laid for the supply to a presumably profitable class of customers. Consequently, in their case, the additional capital outlay was confined to services and meters. He could not see any greater reason for charging meter-rents than there was for charging rent for services. At one time it was, he believed, the practice to charge for laying on services; but this charge had come to be generally abandoned, except in the case of private services. It was not difficult to understand the origin of meter-rents. When gas lighting was first introduced, there were no such things as meters; and consumers were charged at so much per burner. In course of time the meter was invented, and at first was a somewhat costly apparatus. This equitable mode of assessment, however, was felt to be so great a convenience, that the public submitted to a charge which they had, with a very few exceptions, borne with more or less of patience ever since. He was of opinion that it was high time such an exceptional charge should be abolished, and meters looked upon as part of the ordinary stock-in-trade of a gas undertaking. He should much regret it if the opinions entertained by Mr. Woodall at all gained ground.

Mr. MORLAND thought Mr. Woodall was right in saying that if meter-rents were abolished the difference was placed on large consumers. Some one must pay it, and if it was put on the gas, it affected large consumers most.

Mr. HUNT said a differential rate according to the consumption would be the right thing to charge. Let the differential rate cover the meter outlay as well.

Mr. DARWIN said some persons did not burn any gas in the six months of summer, while small consumers burned it all the year round. Others tried to have their meters sent in in the spring, so that they should not pay any meter-rent in the summer, when they were not using gas. He thought the charge against small consumers was balanced by this fact.

Mr. LAYTON said that from the paper he read twelve or fifteen months previously, they would be well acquainted with his opinions on this subject. He had had to do with gas-rentals for twenty years, and was strongly impressed with the desirability and advantage of doing away with meter-rents altogether. There were some injustices connected with the charge for meters. Take a case where 4s. each per quarter was charged for two meters, where a manufacturer did not use a particle of gas. Sometimes he (Mr. Layton) had to charge 5s. for meter-rent for registering 6d. worth of gas. The advantages arising to a gas company from the abolition of meter-rents would do away with the objections now made to the removal of meters where the number of lights had increased, and meters registered against a company. He had a difficulty too, at times, as to whether a wet or a dry meter should be put in, some consumers requiring their own wishes met on this subject. He thought it would be well to abolish meter-rents, and let the cost of meters go in with the other capital of a company. He did not say it was practicable for every manager to go back to his company, and recommend this policy at once. Where a reduction, however, was being made in the price of gas, it would be easy to take off 3d., where 5d. would otherwise be taken off, and do away with meter-rents. He did not think there would be any injury to gas companies from the abolition of meter-rents. He found more grumbling about these rents than about anything else. Persons who would be consumers would not become such on account of these charges, for when they were told that a certain sum was required for meter-rent they said they would not have the gas.

Mr. PEATY thought Mr. Woodall must look at this matter differently to most people, as gas was supplied at Leeds at the manufacturers price. Most companies, he said, went in for profit, and most of Mr. Woodall's arguments in favour of retaining meter-rents would vanish when it was remembered that in most places gas companies were getting for their gas 2s. more per 1000 feet than was charged at Leeds. There was another reason for doing away with meter-rents in regard to getting the right sized meters put in.

Mr. TEW said in his own case at Warwick there were a number of persons who provided their own meters, and in case the Gas Company allowed all consumers to have meters without charge, those who had meters of their own would be in a false position, as they would have invested money in their meters while others had them for nothing.

Mr. NORTH: Buy them up.

Mr. PEATY said his experience of small consumers was that they were not altogether honourable. They caused gas companies considerable difficulty in collecting their accounts, and gave more trouble than they were worth.

Mr. NORTH quite agreed with some of the speakers as to the desirability of abolishing meter-rents, his experience being that they were a nuisance. He sometimes had, he said, cases where a man had built two or three houses, and required 5-light meters fixed; but it was found that he proposed to have 20 burners put on, though he said he should never use them. If a 5-light meter were not put up as wished, the customer would refuse to have the gas at all. Such cases as this would be done away with by abolishing meter-rents, and so also would the difficulty where extra lights were added. He was so far impressed with the desirability of abolishing meter-rents that he had asked his Directors to look at the matter when they next reconsidered the price of gas. Let gas companies do away with meter-rents, and have sole control over the meters, and it would be much to their advantage in the end.

Mr. LAYTON remarked, in reference to one point which had been raised, that in Redditch the Gas Company would buy the meters again if they abolished meter-rents.

Mr. STEVENSON thought the question was one which must be decided chiefly by the large undertakings. In smaller undertakings there were many things which were not quite ripe for the abolition of meter-rents. Supposing the principle was admitted in the case of large undertakings—as that at Leeds especially—it could be carried out with the utmost ease, as Mr. Woodall was supplying gas cheaper than was being done by any other gas undertaking in the kingdom. If meter-rents had been done away with, he would not, perhaps, have been able to reduce the price quite so low as at present; but it might still have been the lowest charged anywhere. He (Mr. Stevenson) was glad Mr. Hunt was in favour of abolishing meter-rents; the thing must be commenced by the large undertakings. If they considered small undertakings, where a comparatively high price had to be maintained, everything must first be done to reduce that price to reasonable proportions in reference to the prices charged elsewhere.

Mr. HUNT observed that there were no meter-rents in Birmingham.

Mr. STEVENSON said with regard to the small consumers, there was no doubt much loss incurred through them. In Peterborough the small consumers were chiefly publicans, and they were everlastingly running away and not paying their gas bills.

Mr. NORTH suggested that deposits should be taken.

Mr. STEVENSON said if they did not run away they were continually changing, which resulted in loss, and not profit. It was the large consumers who required gas at a low price; the small ones, such as shopkeepers, must have gas, if they were to do any business at all. He would like to have meter-rents abolished, but it was a question if it could be done at the present time.

Mr. NORTH remarked that he did not think this was intended.

Mr. WOODALL said his purpose in writing the paper was to provoke discussion, and he knew the very exceptional position in which he stood, seeing that in Leeds gas was sold without profit. He thought it was proper to take into account the profit or loss from any given class of customers, but each manager, in his particular case, would vary those conditions, and apply the facts as he found them. He did not care where the gas was consumed, it cost about 9s. out of pocket to supply the small consumers. If they had a case like that mentioned by Mr. Layton, where a man burned 6d. worth of gas and had to pay 5s. for his meter, the hardship was not his, but the gas company's, and if the company had to supply two large meters without rent, the case would be more than ever hard upon them. Mr. Hunt was surprised that he (Mr. Woodall) should take the line of argument he had, and said the argument was in favour of a differential rate. He had a strong objection to differential charges. A manufacturer did not burn any gas in the summer months, and in winter time had his gas at the lowest price, when it cost more than it would if taken equitably through the year. The differential rate scarcely distinguished the unprofitable consumer, who burned 5000 cubic feet of gas per annum, from the highly profitable customer, who burned 20,000 feet. He had never known cases in which the higher charge did not range up to a consumption of 20,000 or 30,000 feet.

Mr. HUNT: 10,000 feet in Birmingham.

Mr. NORTH: That is quarterly.

Mr. WOODALL: I am dealing with 5000 cubic feet per annum, and I say 10 per cent. of our customers do not burn 10s. worth of gas in a year.

Mr. MORLAND: At 1s. 10d. per 1000 feet.

Mr. WOODALL: Some consumers reduce their consumption to such an amount that it is not worth collecting even if the people did not run away.

Mr. HUNT: But you are supplying gas for the benefit of the public, whether they pay or not.

Mr. WOODALL: We go on strict commercial principles.

Mr. NORTH: Commercial principles mean profit.

Mr. WOODALL: The commercial principle with the Leeds Corporation is the profit of the community.

Mr. HUNT: You pursue the policy of giving away all you have.

Mr. LAYTON: As to people not paying for gas, if they will not pay for gas they will not pay meter-rents.

Mr. WOODALL: There should be some restriction to prevent waste of capital in regard to small consumers. I make a clear case of 9s. out of pocket in regard to the consumers I mentioned, much of it irrespective of consumption.

Mr. COLLETT: The cost of the services might be less by making one service-pipe supply eight or ten of the class of houses you name.

Mr. NORTH: That is a bad principle.

At the conclusion of the above-reported proceedings,

The PRESIDENT said the papers read that day had not fallen short of the high character they had always maintained at meetings of the Association; and he proposed a vote of thanks to the gentlemen who had prepared and read them.

Mr. COLLETT seconded the motion, which was carried.

The PRESIDENT then said: We come now to the election of officers, and as this may be the last opportunity I shall have of addressing you from the chair, I have to thank you very much for the kindness and courtesy you have always exhibited in giving me your support. Feeling my inability to fill it as I ought, I very reluctantly took the position; but by your kindness and indulgence I have been able to get thus far, and I hope the Association has not suffered anything from my presidency. I can only say we have increased very much in numbers. I am glad to notice a number of fresh faces here to-day, and shall be pleased to see even more in future. To those gentlemen who are here for the first time, I should wish to express what has always been my opinion of this Association. I have been aware that it is not a meeting of scientific men, but I have felt that it is a meeting of brothers—a family meeting, where one can speak to his brothers, ask questions, and give information. This is the character the

Association has always taken from the first. Now we come to the election of President, and I take upon myself to ask you to support the gentleman I shall propose to fill that office next year. I have very great pleasure in proposing that Mr. Paterson, of Cheltenham, be elected. It will be an important year, as you are aware, owing to the visit of the British Association to Birmingham, and I would impress upon you to do all you can to make that meeting a success. It lies with us very much, and I hope every member will assist the President and the Committee of our Association to make the visit a success, and then I have no doubt it will be. I take the greater pleasure in proposing Mr. Paterson as our President, for he is on the list of Vice-Presidents of the British Association, and we hope to see him President, and I think we cannot do better than place Mr. Paterson in our own presidential chair. I trust we shall still maintain our reputation, and I am looking forward to fresh laurels in the future.

Mr. HUNT said it was his hope that Mr. Simpson would allow himself to be re-nominated for President, but since this could not be he had pleasure in seconding the nomination of Mr. Paterson, and was sure the meeting could not do better than elect him.

The motion was carried.

The PRESIDENT then proposed that Mr. Tindall be requested to continue in office as Treasurer.

Mr. DARWIN seconded the motion, and it was carried.

Mr. WOODALL proposed the re-election of Mr. North as Secretary. He said he had observed his indefatigable conduct in the past. An Association of this sort called for a great deal of the energy which Mr. North had in superabundance.

Mr. STEVENSON, in seconding the motion, said that things had gone on increasing and flourishing under Mr. North's secretaryship—there had been elected as members at this meeting an increase over the former number of 20 per cent.

The motion having been carried,

Mr. NORTH, in acknowledging the compliment, said he should always do his best to further the objects of the Association.

Two members of the Committee retired by rotation—Mr. Collett, of Dudley, and Mr. Darwin, of Portsea. In their places Mr. Hunt and Mr. Darwin, of Longton, were elected.

Mr. ANNAN then proposed a vote of thanks to the retiring President.

Mr. HUNT seconded the motion, which was carried with applause.

The PRESIDENT acknowledged the vote, and proposed a vote of thanks to Mr. North for the very great energy he had placed at the service of the Association.

Mr. MORLAND seconded the proposition, which was carried by acclamation, and suitably acknowledged.

The members afterwards dined together at the Midland Hotel, and then proceeded by train to Oldbury Station, and thence to the new Albion Gas-Works of the West Bromwich Improvement Commissioners. Mr. W. Littlewood, the Manager, conducted them through the works, which are very extensive and complete in their arrangements. They first inspected the retort-house, then successively the meter-house, purifying shed, engine and exhauster house, and other parts of the premises. Messrs. Kirkham, Hulett, and Chandler's washer, and Messrs. Chandler and Stevenson's Anti-Dips, are special features in the works, which were designed by Mr. G. W. Stevenson, C.E., the Engineer to the Commissioners. After going through the works the visitors partook of some light refreshment provided for them in the offices, and having drunk "Success to the West Bromwich Gas-Works and their Manager, Mr. Littlewood," the visit terminated.

GLASGOW GAS APPARATUS EXHIBITION.

COMPLIMENTARY DINNER TO THE EXHIBITORS.

On the evening of Monday of last week the Executive Committee of the Glasgow Gas Apparatus Exhibition gave a complimentary dinner to the exhibitors and attendants, by way of recognizing the efforts which those gentlemen had made to contribute to the success of the undertaking. The meeting took place in the large Lecture Hall erected by the Committee, and there were present about 100 persons. Dr. ANDREW FERGUS, President of the Philosophical Society of Glasgow, and Convener of the Executive Committee, occupied the chair; and Mr. JOHN MAYER, F.C.S., Superintendent of the Exhibition, and Mr. JOHN MANN, C.A., discharged the duties of the vice-chairs. The other members of Committee present were—Dr. Wallace, F.R.S.E., Sub-Convener; Mr. James T. Bottomley, F.R.S.E., of the University of Glasgow; Mr. St. John Vincent Day, C.E., Mr. D. C. Glen, F.G.S.; Mr. Samuel Stewart, Greenock Corporation Gas-Works; Mr. George R. Hislop, F.C.S., Paisley Corporation Gas-Works; Mr. John L. Bruce, I.A., and Mr. Edward C. C. Stanford, F.C.S.

After an excellent repast had been partaken of,

The CHAIRMAN submitted the toast of "The Queen and the Royal Family," which was duly honoured. He next proposed "The Lord Provost, Magistrates, and Town Council of Glasgow—the Gas and Water Commissioners." He said the Committee of the exhibition were very much indebted to the municipal authorities—as the Gas and Water Commissioners—for their liberality in granting an unlimited supply of gas and water for the use of the exhibitors, without charge, a circumstance which greatly encouraged the Committee to go on with the exhibition. He also referred at some length to the Philosophical Society's exhibition, held in the winter of 1846-7, the surplus proceeds from which had served as the guarantee-fund for the exhibition just brought to a successful termination. He coupled the toast with the name of Dr. Wallace, who, as the Gas Examiner for the city, had some claim to speak on the subject.

Dr. WALLACE replied. Speaking in the name of the municipal authorities, he said they had the very greatest pleasure in fostering the exhibition as much as they possibly could. While remarking that they had given the gas and water free, he at the same time did not believe they had the most remote idea as to the quantity of gas that would be consumed. They, however, looked to some profit arising from the exhibition through the increased demand for gas and water in consequence of a more general use of many of the exhibits. In several ways the exhibition had been a great success. So far as the number of visitors was concerned—though not prepared to give the figures exactly—he said it amounted to nearly 40,000, and although the money drawn, large as was the amount, would not perhaps be quite sufficient to pay their way, they hoped it would not be very far short of doing so.

Mr. STEWART proposed "The Philosophical Society of Glasgow," to which Dr. FERGUS responded. He stated in the course of his remarks that there had been no fewer than 6395 gas connections in the exhibition, from which fact it might be possible to form some slight idea of the quantity of gas consumed.

Mr. STANFORD next proposed "The Health of the Exhibitors," and said he was glad that grumbling on the part of the exhibitors had been the exception and not the rule at the exhibition; and he expressed the hope that the exhibitors were as much pleased with the Executive Committee as the Committee were pleased with them.

Mr. WADDELL (of Glasgow), Mr. WILSON (of Leeds), and Mr. HERON (of Manchester) made suitable replies. Mr. Wilson expressed the hope that other exhibitors had done a satisfactory amount of business. He certainly felt pleased with the measure of success which he had reaped, notwithstanding the fact that spring, rather than the autumn, was the best time for the makers of gas-stoves to do business.

Mr. MAYER, in submitting the toast of "The Gas Managers and Engineers of Scotland," felt that his experience as Superintendent of the Exhibition, and the interest which he had taken in it from the first, would have almost warranted him in offering to speak in support of any one of the toasts on the list; but the one selected gave him an opportunity of informing the meeting of extensive patronage which the exhibition had received from gas managers from Scotland, England, and Ireland, as also from directors of gas companies, corporation gas commissioners, &c. Of the former he ran off from memory some 30 or 40, and he had no doubt that the list could be largely supplemented. He had further pleasure in submitting the toast from the opportunity which it gave him of referring to the valuable service given to the Committee by Messrs. Stewart and Hislop, with whose names he coupled the toast.

Messrs. STEWART and HISLOP made brief replies.

The other toasts were—"The Jurors," proposed by the Chairman, and replied to by Mr. Day, who gave some interesting information regarding the testing of the gas motors; "The Electric Lighting Interest," proposed by Dr. Wallace, and replied to by Mr. Crompton; and "The Engineering Interests," proposed by Mr. Nelson, and responded to by Mr. Glen.

The proceedings soon after were brought to a close.

NOTES FROM SCOTLAND.

(FROM OUR EDINBURGH CORRESPONDENT.)

EDINBURGH, *Saturday*.

The town of Hamilton, in Scotland, occupies a somewhat anomalous position so far as gas matters are concerned. Apparently the civic rulers of the place are anxious to do their very utmost to conserve all that is good for the inhabitants; but they fight most determinedly as to the best mode of conservation. From recent published proceedings it is obvious that the Council contains men who have rather hazy conceptions of the precise meaning of the word "progress," while others, with an impetuousness more characteristic of youth than of "grave and reverend signiors," have been carrying everything before them—sweeping away the foundations of the works which their predecessors had at great expense, and with, as they imagined, much forethought, built for the gas supply, and knocking down and scattering to the four winds the apparatus, ancient and modern, by means of which that gas was extracted from the coal. The question has been over and over again raised in the town, whether there was any necessity for establishing works of such magnitude as are now the property of the Corporation. On the one side, Mr. John Tainsh, who, as Convener of the Gas Committee, made himself thoroughly acquainted with all the *minutiæ* of the manufacture of gas, stoutly maintains that the spending of £11,000 or £12,000 was an unnecessary outlay of public money, as all that was wanted to put the works on a level with the requirements of the town was to provide additional storeage for the gas. But Mr. Tainsh goes farther, for he points to the miserable pittance which was given to the late Manager, and compares it with the existing state of affairs, and deduces from this a charge of recklessness against the Committee now in power. I do not think for a moment Mr. Tainsh means to insinuate that the present Manager is paid too much, but rather that the previous stinginess of the Council had simply recoiled on their own head. Of course, he is met by a triumphant display of figures, to show that within the past seven or eight years the make of gas has almost doubled itself; jumping, as it has done, from something like 19 millions in 1873 to 35 millions last year. Whether this great increase is the result of the extensions, or whether the former supply was too stinted, does not plainly appear; but I am inclined to the opinion that the sudden introduction of populous suburbs within the parliamentary bounds of the burgh has everything to do with the increased demand for gas. In view of this addition, the civic rulers were justified in having ample means for the manufacture; and so far I do not think that Mr. Tainsh has any just cause of complaint; but when he accuses the Committee of rejecting a certain piece of apparatus the working of which had been proved to effect a considerable saving in the make of gas, he stands upon firmer ground. As is pretty well known, the Aitken and Young analyzer was erected at Hamilton, in order to test the merits of the contrivance. The whole theory of the process, as Mr. Aitken once explained, is to keep the tars and gases separate as much as possible, or if they should come in contact, it would only be at such temperatures as would prevent the heavy tars from carrying down with them the lighter hydrocarbons, which form, to a great extent, the light-giving portion of the gas. Some time after this apparatus had been erected, the inventor received assurances from the Convener of the Gas Committee that the analyzer was giving perfect satisfaction, and that it was effecting a saving of something like 20 per cent. This was only bearing out the report of the Committee of the West of Scotland Association of Gas Managers, who, after putting the analyzer to the most crucial tests, pronounced in favour of it, and their opinion was afterwards confirmed by Mr. Stewart, of Greenock, who thought it the best invention that had been brought before the gas world for a long time, and by Dr. Wallace, of Glasgow, who was of opinion that the process was an immense step in advance of anything that had been seen before. Here, then, is the opinion of the best gas engineers that Scotland can produce, and yet, despite that opinion, arrived at only after long and severe tests, it was thrown aside on the report of a gentleman, who, whatever his qualifications might otherwise be in the profession to which he belonged, did not know much about the physics of gas. The question is an all-important one, whether in actual practice the analyzer effects so large a saving in the manufacture of gas, as is claimed for it, and being convinced of his position, supported as it is by the united opinion of so many engineers of eminence, Mr. Tainsh has brought his fellow-councillors to task. Whatever advantage they may have over him in other respects, they have not yet given him any satisfactory answer on this count of the indictment against them. It is not the first time in the history of inventions that an uninformed community have disdainfully refused to accept and introduce machinery intended to advance the interests of special manufactures, and it is only charitable to suppose that want of knowledge rather than personal spleen has been the true cause of throwing the analyzer aside at Hamilton. The two Councillors who have donned their war-paint on this question of gas manufacture are Councillor Tainsh and Bailie Cassels. Last week the redoubtable Bailie produced figures to show that the management for the year had resulted in a saving to the town of upwards of £700; and this week his "pertinacious" opponent—such is the description given, by the Bailie, of Mr. Tainsh—enters the lists, and publishes figures to show that during the past year there has been a loss of £299 1s. 5d. But these are matters of detail. I should like to see the broader question as to the analyzer fought out.

Lochanbank, and other ground on the Blackwood Estate, have been leased to a Company who purpose working the famous Lesmahagow cannel coal. The field is thought to contain gas coal in such thickness of seam as will amply pay the Company, and in this field operations are to commence at once.

Last week I made reference to the great scarcity of the supply of water for Greenock, and to the probable effect which the continued drought

would have upon the sugar refineries of the town. This week, owing to the very slight rainfall, it has been resolved to shut off the supply to the sugar refineries. Some idea of the terrible calamity which results from this resolution may be formed when it is stated that about 4000 men will be thrown out of employment.

While the people of Greenock are looking forward with no small degree of anxiety to the future, the inhabitants of Kirkcaldy are wrangling as to whether an additional inch pipe shall be laid alongside the present one, and also as to whether a new reservoir, filters, &c., shall be made. The scheme which has been submitted to the Council this week is estimated to cost £30,000. As almost everybody in Scotland is aware, Kirkcaldy is the very hotbed of Radicalism, and some of the chiefs of that way of thinking have not been slow to lay it to the charge of the manufacturers that they are moving in this scheme from purely selfish motives; but the answer is that the manufacturers employ the greater part of the population of the "lang toon," and that therefore the benefit arising from an increased supply of water would be mutual. The recommendation of the Committee to prepare the necessary parliamentary notices to carry out the scheme has been approved of by the Council.

(FROM OUR GLASGOW CORRESPONDENT.)

GLASGOW, *Saturday*.

As a sequel to the announcement in this week's JOURNAL regarding Mr. Levi Monk, late Gas Manager at Lanark, I may mention that his successor in that post has been appointed, the choice of the Directors of the Lanark Gas Company having fallen upon Mr. James Martin, who has been for about nine years past Gas Manager to the Kilmalcolm Gas Company. Before leaving Kilmalcolm to enter upon his new sphere of professional duty, Mr Martin was entertained in the Buchanan Arms Hotel, on which occasion he was presented with a purse of sovereigns in recognition of his many good qualities.

The appointment of Manager to the Coatbridge Gas Company in succession to Mr. Robert Mitchell, who recently took service under the Glasgow Corporation Gas Commissioners at the Dawsholm works, has not yet been made. There were 44 applicants for the vacancy, and fully a fortnight ago seven of the most likely candidates were selected as a leet. I understand that the works of these candidates have been visited by a Sub-Committee of the Coatbridge Directors, who are, I believe, in a position to name the man of their choice. The appointment is to be made early in the ensuing week.

In connection with the lighting of the Queen Street Station, the Glasgow terminus of the North British Railway system, there seems to have been a "game of cross purposes" amongst the Company's Directors. For a time it was confidently stated that the lighting was to be done with gas, and that Messrs. G. Bray and Co.'s system of flat-flame burners and lanterns had been agreed upon, even to the extent of the exact number of the lanterns. Now, however, it has transpired that a contract has been closed with Messrs. R. E. Crompton and Co., of London, who have three powerful lights going every night, the dynamo machines (of the Gramme kind) being driven by a portable engine made by Messrs. Marshall, Sons, and Co., Gainsborough. The contract is said to be concluded at 4s. per hour, Messrs. Crompton and Co. supplying everything. I believe I am right in saying that the gas-supply apparatus that would have been required for lighting the station was actually ordered from the before-mentioned Leeds firm. Something in the shape of a "shindy" is talked of in connection with this matter.

Referring to the Glasgow Exhibition of Lighting and Heating Appliances, &c., I may mention that there is a serious hitch in regard to the testing which the Committee of Jurors on Electric Lighting Appliances proposed to carry out with the four firms whose apparatus was shown in operation while the exhibition was open. The proprietors of the "Mackenzie" Light (Messrs. Strode and Co., of London) "struck their colours" before the actual closing of the exhibition. It, therefore, was soon "out of the running." Then, after the lapse of a few days the "Lontin" system was withdrawn by Messrs. Latimer Clark, Muirhead, and Co., the Engineers to the Electric Light and Generator Company. Lastly, the "Brush" Electric Light Company have had all testing suspended until further instructions are received from head-quarters. The Committee have spent a good deal of effort and technical skill on the Crompton exhibits, and the testing of the engine is to be continued shortly at the General Post Office here, where the electric light is also to be tried, the new premises being regarded as specially suitable.

On the question of the jurors work in connection with the exhibition, I may mention that the exhibitors in only four out of the ten sections in which the exhibits were grouped have yet received official information as to the results of the testing and adjudication—Gas-Meters, Governors, &c.; Gas-Engines and Air-Engines; Hydraulic Appliances; Ventilating and Sanitary Appliances, &c.; and Safety Lamps, Mining Appliances, Fire-Clay Goods, &c. It has been the desire of the several Committees of Jurors to do their work most thoroughly, and hence the delay.

The Directors of the Carluke Gaslight Company have resolved to lower the price of gas to 4s. 7d. per 1000 cubic feet, commencing the reduction on the 1st of November. This is the lowest price that ever gas was sold at in Carluke—a fact which speaks highly in favour of the management under the present Directors.

A comparatively active demand had been experienced in the Glasgow pig iron market this week, with a large amount of business done daily. The closing prices on Friday afternoon were 51s. to 51s. 3d. cash in eight days, and 51s. 4½d. one month, and the market closing nominally at 51s. 3d. cash.

The coal market is still showing signs of improvement, and prices are stiffening.

CURRENT SALES OF GAS PRODUCTS.

(FROM A MANCHESTER CORRESPONDENT.)

All gas products show a rising tendency, and appear certain to advance a little in price, with a prospect of firmness for some time. Pitch in better demand than it has been lately. All gas products used in the aniline manufacture appear likely to be in more demand. The following are some of the prices realized in recent sales:—

Tar, 38s. to 40s. per ton; prices advancing.
Pitch, 15s. per ton; selling freely.
Ammoniacal liquor, sp. gr. 1·35, selling freely at 24s. per ton.
Ammonia sulphate (white), £19 10s.; (grey), £18 5s. per ton; demand increasing.
Chloride (best white), £44; (white), £40; (grey), £30 to £35 per ton.
Brown vitriol, £2 18s. per ton.
Muriatic acid, 27s. to 30s. per ton.
Oxide is worth 30s. per ton.

WINSLOW NEW GAS COMPANY, LIMITED.—This Company, which was registered on the 20th ult., with a capital of £5000 in £10 shares, proposes to construct gas-works for the purpose of supplying gas and gas products to the inhabitants of Winslow, Bucks.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

LANCASHIRE AND CHESHIRE DISTRICT MEETING.

The district meeting of the Lancashire and Cheshire branch of the above Association was held at Salford last Friday, and visits were paid to the Salford new sewage works at Weaste and to the Manchester Corporation Health Committee's depôt at Holt Town. The members, of whom about 40 were present, assembled in the forenoon at the Swan Inn, Weaste, and then proceeded to the Salford sewage works, situate in the immediate neighbourhood. Here they were met by Mr. Arthur Jacob, the Borough Engineer, who, prior to conducting them over the works gave a short description of the development of the sewerage system of Salford, and also of the new sewage works, to which reference was made in the JOURNAL a short time back (*ante*, p. 539).

Mr. Jacob, in the course of his remarks, said that in the year 1863 the question of dealing with the drainage of the borough of Salford first came under the consideration of the Council, and in that year Mr. Clement Trapp, their Surveyor, reported upon the matter, advising, amongst other things, that there should be an intercepting sewer to take up all the sewage which hitherto had run into the river, and to lead it to the site of the present works at Mode Wheel, Weaste. Mr. Trapp also recommended the construction of a tunnel from a point near the Peel Park, to carry away the Broughton sewage, but this work had never been carried out. Since the submission of the scheme other plans had been suggested by succeeding engineers, and the final result had been the construction of a trunk sewer, commencing at Mode Wheel, and following generally along the right bank of the River Irwell up to the Sherbourne Street Bridge, near which point the sewer passed under the river, then cut across an important loop of the stream, again passed beneath it at the top of Montague Street, and traversed the low flooded land lying between Higher Broughton and Pendleton. This sewer varied in dimensions from 8 ft. 9 in. by 7 ft. at the outfall to 3 ft. by 4 ft. at the upper extremity. In the year 1877, as the trunk sewer was proceeding towards completion, a scheme for dealing with the sewage at the outfall was projected by Mr. Alfred M. Fowler, the then Borough Engineer, and it was a modification of this scheme which was now being carried out. It was intended to treat the sewage by precipitation, and the scheme adopted by the Council was somewhat similar to that in operation at Leeds. There were arranged in duplicate six precipitating-tanks, making twelve in all. Each of the six reservoirs was a few inches below the tank immediately above it, so that the sewage would flow from one end to the other, until at the farthest end it would pass away comparatively purified, or, at any rate, free from suspended matter. As first designed, the tanks would have occupied the lowest ground, presumably in order that the lift of the sewage should be reduced to a minimum, which was a necessary and advisable provision, if, as was intended, centrifugal pumps were to be employed; but Mr. Jacob advised that the precipitating-tanks should be placed on the highest part of the site. The tanks were 113 feet long, with an average width of 78 feet. They had a total area of 102,857 square yards, and their cubic contents when full would be 720,000 cubic feet. Sewage was diluted at the most remote end of the tanks, and the effluent water, which flowed towards the mixing-houses, was used to drive a pair of turbines, which actuated the mixing machinery, and to raise water for employment in the process. Thus to some extent the power of the pumping-engines was made available. The engines to be employed were of the compound vertical type.

The party were then conducted over the works, and the details of the process explained by Mr. Jacob. The work has been in progress for two years, and it is expected will be completed in the course of another twelve months. Salford, which has taken the lead in the district, in dealing with sewage before emptying it into the River Irwell, the present polluted state of which is well known, will then possess one of the most complete systems of the kind in existence in the kingdom.

On returning to the offices a number of questions were put to Mr. Jacob, and some discussion arose as to whether lime, which will be employed to effect precipitation in the tanks, was the best material to use for this purpose. Some members questioned whether a better material could not be found, and Mr. Jacob said he was not quite sure that it was really the best, but it had been found to do its work very well. The President, Mr. Alfred Morant, Borough Engineer of Leeds, then proposed a vote of thanks to Mr. Jacob, which was unanimously accorded, and the formal business of the meeting was afterwards transacted, Mr. R. Vawser being re-elected Honorary District Secretary for the ensuing year.

A number of the members afterwards proceeded to the Manchester Corporation works at Holt Town, where they had an opportunity of inspecting the process of converting the nightsoil of Manchester into a native guano for agricultural purposes. These works cover an area of more than 6 acres, and have been erected at a cost of more than £90,000. In Manchester there are about 60,000 dry-ash closets, so arranged that all the liquid and solid excrementitious matters are deposited in a pail, and automatically covered with a small quantity of fine ashes. The pails, as well as the rubbish from the dust-bins, are removed in vehicles specially designed for the purpose, and conveyed to the works, where the contents of about 40,000 closets, consisting of 1600 tons of rubbish, are dealt with each week. The contents of the receptacles are here poured into a machine which separates the fæces from the foreign matter, the latter being used as fuel, whilst the former, during its progress from the top floor of the building to the bottom, is converted into a finely-granulated manure, which is sold at £3 per ton. Of this manure 42 tons are made daily, and the other rubbish after having done duty as fuel for the boilers, and been converted into clinkers, is ground with lime in powerful mills and converted into mortar.

The visit to these works closed the day's proceedings.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

There is a decidedly stronger tone in the market here so far as all the better qualities of round coal are concerned, and throughout the Wigan and neighbouring districts an advance of about 6d. per ton is being obtained in the pit price of Arley and Pemberton four-feet coals, the best qualities of which now average about 8s. 6d. and 7s. per ton respectively. In the Manchester district there has been a further upward movement in the delivery rates of domestic coal to the extent of about 10d. per ton; but the pit prices are not yet materially altered, as some of the large firms have heavy stocks which they are anxious to clear away. It is, however, still only for house-fire coals that any real advance is being obtained; other classes of fuel for manufacturing purposes being offered at about late rates.

In gas-making coals there is about the ordinary business doing for the season of the year, which is chiefly confined to small quantities for private consumers. For best screened Wigan Arley gas coal 7s. to 7s. 6d. per ton at the pit is quoted, but common Wigan gas coals are to be bought as low as 5s. to 5s. 6d. per ton at the pit. Common round coal for steam and forge purposes does not yet meet with any materially increased demand, and 5s. to 5s. 6d. per ton at the pit is about the top price for this description of fuel. Burgy is getting rather scarce, but slack is becoming rather

a drug, and there is a slight giving way in prices in some cases. Good burgy at the pit is quoted at 4s. to 4s. 6d., and good slack at 3s. to 3s. 6d. per ton.

Shipping has been very quiet, and common round coal is still being offered for delivery at the High Level, Liverpool, at as low as 6s. 6d. per ton.

In the iron trade there has been a good deal of buying going on for forward delivery, and the further sellers are prepared to go into next year, the larger the quantity of iron they can sell; but there is no demand for prompt delivery. Lancashire makers of pig iron are selling up to the end of March for delivery equal to Manchester at 46s. 6d. to 47s. 6d. per ton, less 2½ per cent., and local bars are offered at about £5 15s. to £6 per ton.

Pipe founders are getting rather busier, but low prices are still quoted.

NOTES FROM MONMOUTHSHIRE AND SOUTH WALES.

(FROM OUR OWN CORRESPONDENT.)

The shipments of coal at Cardiff during the past week were very satisfactory, and no change was experienced with regard to price. The quantity of coal shipped at that port was 92,776 tons, and at Newport 17,568 tons. However, this does not represent the respective capacities of the two places as shipping ports, the latter town possessing a large reserve of power in its extensive Alexandra Dock, the basin of which covers a superficial area of 23 acres. The number of tons shipped will probably be doubled when the Newport, Pontypridd, and Caerphilly Railway, now in progress, is completed.

There is one rather peculiar feature which I should like specially to note in respect to our local trade—namely, that while tin-plates do not advance, tin itself commands a stiff price, and this would seem to indicate that iron, which is the other element in tin-plates, is still low. I may say the same for steel. A large steel-works, which during the whole of the depression was in full swing, is now nearly idle. A third point which I note from my own observation is that a local company, who have a considerable line of railway to lay, have been recommended by their responsible adviser to purchase rails at once. To sum up, iron and steel do not command high prices, at least in this locality, and I would give a hint to all in the gas world who have sidings to lay, that they will never find a more favourable opportunity than the present for buying rails.

The new tin-works at Cwmavon, which have been for some time in course of erection, have now been completed, and the first bar of tin iron was rolled last Wednesday morning. The building was used some years back as a rail mill, and is very extensive. There are now in full work 16 furnaces which will, it is estimated, consume 50 tons of coal daily. About 80 men are engaged at these works, and this, with the extra colliers and others employed throughout the valley in connection with the undertaking, will in all probability increase the amount of wages paid monthly by £1000. It is the intention of Mr. J. Shaw, the proprietor of the works, to shortly commence the manufacture of tin-plates, for which purpose mills will be erected.

THE SOUTH STAFFORDSHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

It is generally admitted that the state of the coal trade in the South Staffordshire district is improving. At least, so far as is shown by the business transactions of the past week or two, things have taken a better course. Though most notably in the domestic coal business, yet other qualities are alike receiving a greater demand. A fair quantity of orders have been placed in the district for forge and furnace consumption, and inquiries, too, for this class of fuel are said to be considerably more numerous. Household qualities are most in demand from the Cannock neighbourhood, where, too, an advance of 1s. per ton has been decided upon. In this particular branch of the trade an increase of rates has been looked upon as a certainty for some time past, but there are but slight indications that a like increase will be made on any of the other different classes of fuel. Gas coals are fairly inquired after, but stocks are still plentiful, and at most of the pits whence the contributions to the supply are a characteristic feature, the men are making more time than in the case of any other class, domestic fuel, of course, excepted. For the rough and common qualities there is also an improved demand. As compared with the state of trade in this district twelve months ago there is a decided outlook for the best. The principal features, however, are the improved demand for domestic fuel, and a slightly growing market of iron-making fuel of all classes. Cokes are numerous, the market is well stocked, but prices are firm on account of a fairly existing demand.

The business transactions in the iron trade have somewhat improved during the past week, so far as finished iron is concerned. Several good orders have been placed in the district, and these have had the effect of slightly increasing the rates of a week ago. Quotations for medium qualities of finished iron are 2s. 6d. per ton higher. Best bars are steady at £7 10s., and common at £6 10s., though a few sales in bulk have been made during the week at prices as low as £5 10s. A more cheerful tone also prevailed at the Birmingham Exchange on Thursday, and orders were more liberally distributed. For several qualities of local production, but chiefly for sheets, bars, hoops, strip, and rod, inquiries were numerous. The pig trade is scarcely so good, nevertheless the orders given were for quicker delivery than is usually asked. The number of furnaces in blast has again slightly decreased, and at the present time there are but 48 in full work. The majority of these are, however, producing a large quantity of iron, and it is satisfactory to note that the stocks are not increasing. The export trade is still unmarked by any feature of importance, the majority of sales effected being for local consumption. Makers of girder and bridge work are well employed, as also are galvanizers and tube makers.

THE YORKSHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

Since my last notice a still further improvement has taken place in the ordinary coal trade in both South and West Yorkshire, so that at many places full time is now being worked. The pits in the Normanton and Sharlstone districts are very well off for orders, as are most other places in West Yorkshire. The Silkstone and Barnsley thick-seam pits are doing an active business; yet, strange to say, the tonnage by the Great Northern line has not been so good as might have been expected, but the Midland had an increase last week. There is just now an active demand for domestic kinds of coal for the Eastern Counties, and in some instances supplies are not equal to the demand. Prices have increased, but in few instances do they exceed 1s. per ton.

Steam coal is in not nearly so good request as it was a short time ago, and it is feared that, when the northern ports are closed, business will be very moderate indeed. The exports, as is usual at this period of the year, are falling off, yet orders on account of existing contracts are being pushed forward.

On the whole, a large tonnage of coal suitable for gas-making purposes is being raised, more especially at the South Yorkshire pits. Some of the collieries in the Rotherham district have been fortunate enough to secure some good contracts for supplies to the Midland gas companies.

Other descriptions of fuel are in moderate request, but prices continue low, and for some kinds sales have to be forced. The usual supplies of locomotive coal are being forwarded to the various railway companies, and some of the pits have a fair inquiry for manufacturing coal. The coke trade is active when the large output is taken into account. A fair quantity is consumed at the local furnaces, but by far the largest tonnage is sent to other smelting districts, North Lincolnshire taking the lead.

Taken as a whole, there is but little new to note respecting the iron and steel trades carried on in the county. The output of pig iron continues to be fully up to the average, whilst stocks are not over large. Generally speaking, the foundries are badly off for work, as are also machinists. Makers of Bessemer steel rails and tires continue to do a good business, and most firms engaged in waggon building and repairs are much better off for work than they were a month or two ago.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The shipments of gas coal by steamer were very large last week. Boats had been sadly thrown out of their regular courses by the fearful weather of the previous week, and most of the turn steamers lost a voyage. There has been no such storm for at least a quarter of a century; and though some of the gas-works may have been put to inconvenience by a short supply of coals, it is highly satisfactory to note that to not one of the large fleet of steamers engaged in the gas coal trade to London and elsewhere happened any disaster in the hurricane, and that as soon as the weather moderated the trade was in full vigour again. The whole of the Durham pits working a fair average quality of gas coals are very well employed. They will continue to be so, no doubt, until the end of April. Prices remain about the same. For the reasons stated in this column from time to time, it is probable there will be very little change in them over the winter. Steam coals are doing poorly, and in the second-class coal trade, very much as consumption has increased, there is still more production than there is demand. The coke trade is in a better position in the market, in regard to increased consumption at the iron-works and for shipment.

Small sailing vessels are scarce, and, on acount of recent heavy losses at sea, they will be so over the winter. But steamers are coming out of the Baltic trade rapidly, and the upward tendency of freights coastwise will be thus checked in two directions—first, by a better supply of steam tonnage and through railway competition. The rate paid to steamers to load coals to London last week was 4s. 6d. per ton, large steamers.

The business doing in manufactured iron is pretty steady. Foundry work is going on well on the Tyne. The fire-clay and fire-brick trade with the Baltic is being rapidly brought to a close for the season. The fire-clay and cement trade of the Tyne is dull. Cement is in poor demand. Lead is weak. Copper has become steadier. The timber trade is quieter in all its branches. Chemicals go badly, and are not likely to be any better this year. They are as low in price as in the worst times of depression.

REDUCTION IN THE PRICE OF GAS AT DEAL.—The Deal Gas Company have reduced the price of gas 10d. per 1000 cubic feet—from 5s. to 4s. 2d.

DORCHESTER GAS-FITTINGS COMPANY, LIMITED.—A Company under this title was registered on the 23rd ult., with a capital of £850 in 10s. shares, to manufacture and deal in gas-fittings.

FYLDE WATER-WORKS COMPANY.—The half-yearly general meeting of this Company was held on the 27th ult.—R. Dunderdale, Esq., J.P., in the chair. The Directors report which was presented stated that the expenditure on capital account had been increased during the half year by £922 3s. 2d., and amounted to £178,736 3s. 1d. The amount received for water for all purposes, and for profit on fittings, during the half year was £7437 5s. 10d.; less interest on loans and commission, £749 16s. 11d.; working expenses (including rents, rates, and taxes), £1843 3s. 3d.; and allowances for empty houses and bad debts, £370 17s. 8d.; leaving a balance of £4473 8s. The number of consumers had increased by 198, and now amounted to 7385. The Directors recommended a dividend on the subscribed stock at the rate of 4½ per cent. per annum, free of income-tax, and that the balance of about £1050 be carried to the reserve-fund. The report was adopted, and the proceedings closed with the usual vote of thanks to the Chairman.

THE WATER SUPPLY OF BINGLEY.—A meeting of the ratepayers of Bingley to consider the question of applying for an Act of Parliament for the better supply of good water for the town was held last Wednesday. The chair was occupied by Mr. T. Eckroyd, Chairman of the Bingley Improvement Commissioners, who, after reading some correspondence which had passed between the Bradford Corporation, the Commissioners, and Mr. W. B. Ferrand, proposed that the suggestion of the Commissioners should be adopted, and that proceedings should be instituted forthwith to obtain an Act of Parliament. The Town Clerk of Bradford (Mr. W. T. M'Gowen) laid before the meeting certain facts to show that the Commissioners could not possibly obtain the proposed Act without the sanction of the Bradford Corporation. In the course of the proceedings it was stated that the proposed scheme, according to the estimate of Mr. E. Filliter, C.E., of Leeds, would cost about £55,500. The motion was eventually carried.

THE GAS SUPPLY OF BARNSLEY.—A meeting of the inhabitants and ratepayers of Barnsley, convened by the Mayor, was held on Friday, the 26th ult., for the purpose of considering the question of purchasing the local gas-works. The following resolutions were carried unanimously:—"That, in the opinion of this meeting, the time has now arrived when steps should be taken by the Town Council to purchase the Barnsley Gas Company's works, if such can be obtained on equitable terms;" and—"That this meeting respectfully requests the Town Council to take the earliest opportunity for carrying out the foregoing resolution." Two of the Shareholders in the Company—an Alderman and a Councillor of the borough—expressed their belief that the works could be obtained "on fair and equitable terms;" but notwithstanding this, the following motion, of the nature of a threat, was subsequently agreed to:—"That in the event of the Town Council not being able to come to terms with the present owners of the gas-works, we, the burgesses, strongly recommend them to take immediate steps to obtain parliamentary powers to erect new works."

STOCKTON AND MIDDLESBROUGH CORPORATIONS WATER SUPPLY.—The *Leeds Mercury* of the 5th inst. says: "Yesterday another of a series of private meetings was held by the Stockton and Middlesbrough Corporations Water Board. The object of the meeting was to consider the propriety of applying to Parliament for additional powers to enable the Board to construct new works proposed by a scheme submitted by Mr. Mansergh, C.E., London, which would embrace the erection of a large reservoir at High Force on the Tees, and other works in connection with the supply of water for Stockton and Middlesbrough and neighbourhood, and which would involve the expenditure of upwards of £209,000. The Board discussed the report of a geologist, who pointed out the inexpediency of

making a reservoir at High Force. After an hour's conversation, it was agreed to abandon the scheme, and to recommend the Stockton and Middlesbrough Corporations not to proceed with the proposed application to Parliament at present. It is the intention of the Board to carry out extensions under their Provisional Order as they may be needed."

SHOREHAM WATER-WORKS COMPANY.—The ordinary half-yearly meeting of this Company was held on the 30th ult.—Dr. Fuller in the chair. The report presented by the Directors stated that during the previous half year services had been laid to 135 additional houses, producing an annual rental to the Company of £125. The profit and loss account showed a net profit of £458 7s., which would be more than sufficient to pay a divident at the rate of 5 per cent. per annum on the total amount of capital authorized by the Shareholders, this profit having been earned almost entirely by the old business of the Company. The new works were nearly complete, the two service reservoirs were finished, and the new pumping machinery was fixed, so that the Directors were prepared to supply the new district of Portslade Village, from which they expected a substantial return. The balance of profit and loss account admitted of a dividend being paid of 5 per cent. for the half year on the original shares, and the sum of £150 being carried to the reserve-fund; and the Directors recommended that such balance be so disposed of, leaving £153 2s. 4d. to be carried forward to the next account. The report was adopted, and the proceedings closed with a vote of thanks to the Chairman.

Register of Patents.

APPLICATIONS FOR LETTERS PATENT.

4408.—NAWROCKI, G. W. VON, Berlin, "Improvements in photometers." A communication. Oct. 28, 1880.

4419.—BENSON, M., Chancery Lane, London, "Improvements in gas-engines." A communication. Oct. 29, 1880.

4444.—LAKE, H. H., Southampton Buildings, London, "Improvements in electric gas-lighting apparatus." A communication. Oct. 30, 1880.

4487.—KENNEDY, T., Kilmarnock, N.B., "Improvements in water supply apparatus, such as is known as 'wells' or 'drinking fountains.'" Nov. 3, 1880.

4520.—STEVENSON, J. S., Dublin, "Improvements in apparatus for the distillation of ammoniacal liquor." Nov. 4, 1880.

4528.—MACDONALD, J., Queen Victoria Street, London, "Improved means of and apparatus for increasing the illuminating power of coal gas." Nov. 4, 1880.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

2065.—SUGG, W. T., Westminster, "Improvements in railway carriage lamps, and in the means of supplying illuminating gas thereto." May 21, 1880.

3261.—MELLING, T., Aigburth, Lancs, "Improvements in water meters or motors, or apparatus for measuring and registering the quantity of water or other fluid flowing through pipes or other conduits, which improvements are also applicable to other hydraulic purposes." Aug. 10, 1880.

3436.—LAKE, W. R., Southampton Buildings, London, "Improvements in fluid meters." A communication. Aug. 24, 1880.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

3956.—JOHNSON, J. H., "Improvements in hydrants." Oct. 25, 1877.

3980.—QUAGLIO, J. VON, "Improvements in purifying coal gas from bisulphide of carbon and other sulphur compounds." Oct. 27, 1877.

3992.—WIRTH, F., "Improvements in apparatus for and in the treatment of ammoniacal liquids." Oct. 29, 1877.

4028.—HUGHES, E. T., "Improvements in pumps." Oct. 30, 1877.

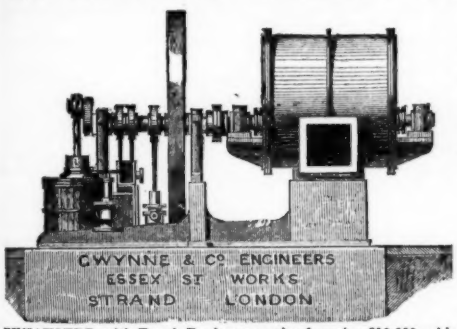
PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

3457.—WEEMS, W., "Improvements in apparatus or means for lighting and ventilating." Oct. 24, 1873.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

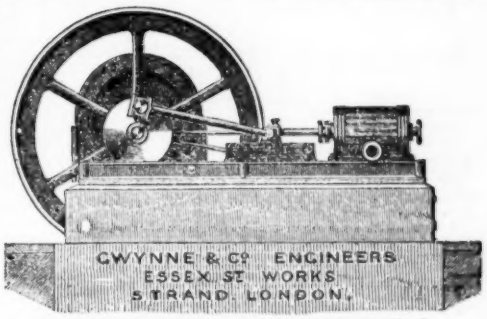
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

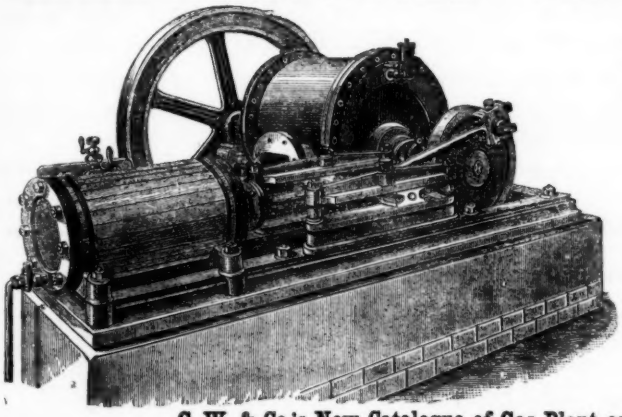
Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,

WITH

Wrought-Iron Spindles and

ENGINES COMBINED.



SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

[*SEE ALSO ADVERTISEMENT, PAGE* 750.]

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of a Pamphlet, prepared for Gas Companies to distribute to Gas Consumers—"Cooking & Heating by Gas;" on Burners, &c.
Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WANTED, by the Advertiser, a Young Man, aged 27, an Engagement in a Gas Company's Office, Assistant Engineer, or Clerk of Works, &c., has had every experience in a Gas-Works. First-class testimonials and references.
Address No. 695, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Young Man (married), a Situation in a Gas-Works. Is the son of a Manager, and is a good Main and Service Layer. Can do any Fittings in the Retort-House; also can Fix and Read Indexes of Meters, and has had experience both at Lathe and Vice. Very steady.
Apply to the MANAGER, Gas-Works, Crayford, KENT.

WANTED, by the Advertiser, a Situation as CARBONIZING FOREMAN of a large Gas-Works; or WORKING MANAGER of a small Works. Can Lay Mains and Services, Read Meters, and is well up in the general routine of a Gas-Works. Good testimonials.
Address No. 700, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED,—The Advertiser, a Young Man, aged 39, married, is open for an Engagement as MANAGER and SECRETARY of a medium-sized Gas-Works, or SUB-MANAGER of a large Works. Has a thorough Knowledge of the Manufacture and Distribution of Gas in all its branches, having had sole management of Gas-Works for 16 years. Highest testimonials and references.
Address No. 678, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Advertiser, a Young Man, aged 23, is open for an Engagement as MANAGER and SECRETARY of a medium-sized Gas-Works; or SUB-MANAGER of a large Works. Has a Knowledge of the Manufacture and Distribution of Gas in all its branches; having had the management of Gas-Works for some time. Highest testimonials and references.
Address F. S., Gas-Works, WIGAN.

WANTED, in a small Country Gas-Works, a WORKING MAN who has been accustomed to take charge.
For particulars apply, with reference, to the SECRETARY, Gas Company, STEYNING.

MAIN AND SERVICE LAYER.

WANTED immediately, a Main and SERVICE LAYER for a Gas-Works in South Wales. A permanent engagement to a steady, experienced man.
Address, with all particulars, No. 699, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ACCOUNTANT WANTED.

WANTED, by a Gas Company in the Provinces, an Experienced ACCOUNTANT, who understands Book-keeping by Double Entry, on the most approved principles; also the Preparation of the Annual Balance-Sheets, and the routine of an Office. Salary £150 per annum.
Applications to be made, in own handwriting (and the highest references required), to No. 698, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, to Lease Gas-Works
Highest References.
Apply, by letter, to No. 686, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED to Purchase, a New or Second-hand LIVESEY'S SCRUBBER suitable for small Works making about 7 million cubic feet per annum.
Address, with price and particulars, to Mr. JOHN CLARK, Gas-Works, Hessle, near HULL.

AMMONIA PLANT FOR SALE.

A COMPLETE Plant in thorough work-ing order, to make up to 1½ tons daily; or Saturator and Crystallising Pans will be sold separately. Also Cornish and other Boilers, Tar Stills, Hydraulic Press, Iron Tanks, Tangye's Pumps, &c., for Sale, and Waterside Premises to be Let.
Apply to T. V. CLARKE, on the premises, Trundley Lane, Surrey Canal, DEPTFORD, S.E.

FOR SALE.—A Purifier, 10 ft. square, 5 ft. deep, 10-in. Inlet and Outlet.
One 10-in. Centre-Valve for working four purifiers.
Two 6 ft. by 5 ft. Circular Cylinders.
One Lifting Screw for Purifier Lids.
A Condenser complete, with cast-iron Boxes, a double row of 10-in. Pipes, 8 in. each row, and about 28 ft. high, with 10 in. Inlet and Outlet, Connections, and Bye-pass, and three 10-in. Valves.
All the above are in capital condition. Also a quantity of Old Iron.
For further particulars, apply at the Gas-Works, Bromley, KENT.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS REPORTS for 1869, 1870, and 1876.
THE Institution of Civil Engineers re-quire the above-named reports in order to complete their set.
Any one, having copies to spare of any or all of the three, will oblige by communicating with the Secretary of the Institution,
JAMES FORREST.
25, Great George Street, Westminster, S.W.

IMPERIAL CONTINENTAL GAS ASSOCIATION.
(INCORPORATED BY ACT OF PARLIAMENT.)
The HALF-YEARLY ORDINARY MEETING of this Association was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, the 2nd inst.,
SIR JULIAN GOLDSMID, Bart., Chairman,
When the following resolutions were passed:—
Resolved unanimously—"That the Report upon the affairs of the Association be received, adopted, and entered on the minutes."
Resolved unanimously—"That a dividend of £5 per cent. be declared upon the £2,800,000 capital stock of the Association for the half year ended the 30th of June last, and a bonus of £1 per cent., and that the said dividend and bonus be payable, free of income-tax, on and after the 1st of December next."
Resolved unanimously—"That the cordial thanks of the meeting be given to the President and Directors, for their able management of the affairs of the Association, and to the Chairman for his conduct in the chair this day."
Upon the motion of the Chairman (Sir Julian Goldsmid, Bart.) a vote of thanks was also given to Mr. L. G. Drory, and to the Agents, Engineers, and other Officers of the Association.
By order of the Board,
R. S. GARDINER, Secretary.
30, Clement's Lane, Lombard Street, E.C.,
Nov. 3, 1880.

FOR SALE — One 7-in. Gas Governor, with 7-in. Valves and Bye-pass complete; in good condition. Offers wanted.
Apply to W. WEDGWOOD, Gas-Works, ILKLEY.

THE Gloucester Gas Company have the undermentioned APPARATUS for Sale:—
About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.
Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12-in. Connections.
Exhauster (Jones) to pass about 15,000 feet per hour.
Exhauster (Beales) to pass about 25,000 feet per hour.
Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.
Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.
4-horse power Horizontal Steam-Engine.
Two Purifiers, 16 ft. by 8 ft., with six 12-in. Slide-Valves and 12-in. Connections.
Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.
Gasholder, Double Lift, capacity 100,000 feet.
Gasholder, Double Lift, capacity 240,000 feet.
One 12-in. Governor, by Wright, London, with 12-in. Valves, Bye-Pass, and Connections.
Two 12-in. four-way faced Valves, by Cockey.
For further information, &c., apply to the undersigned.
R. MORLAND, Engineer.

TAR CONTRACT.

THE South Metropolitan Gas Company invite TENDERS for the Surplus TAR, about 700,000 gallons, from their Rotherhithe Station for the year 1881.
Particulars may be obtained on application to the undersigned.
Tenders to be sent in by Wednesday, Nov. 17.
By order of the Board,
GEORGE LIVESEY, Secretary and Engineer.
Nov. 1, 1880.

TENDERS FOR PIPES.

THE Nelson Local Board Gas Committee invite TENDERS for the following PIPES, 9 ft. long, turned and bored Joints, with a cavity for lead:—
Lot 1.—100 10-in. Pipes and 100 6-in. Pipes.
Lot 2.—200 14-in. Pipes.
The two lots to be tendered for separately and together.
Pipes to be delivered at Nelson Station, Lancashire.
For further information, apply to
WILLIAM FOSTER, Manager.

MALTA.

LIGHTING BY GAS VALLETTA, FLORIANA, MARSA, SENGLEA, COSPICUA, & VITTORISSA.

SEALED Tenders will be received at this Office until noon of Monday, June 3, 1881, for Lighting by Gas the Streets of Valletta, Floriana, Marsa, Senglea, Cospicua, and Vittorissa, for a period of Ten years, to date from May 15, 1882.
Tenders to be on the established printed form supplied by this Office.
The conditions of the contract and further particulars will be made known on application to this Office.
Each tender is to be accompanied with a deposit of £200, which sum is to be temporarily lodged with the Receiver-General, to be dealt with as stated hereunder; and no notice will be taken of any tender unless the due fulfilment of this condition be found endorsed thereon by that Officer.
The deposit thus made shall be forfeited in favour of Government should the party tendering, or the surety, fail to appear for the stipulation of the requisite contract in the event of the tender being accepted, within three days from the day of the notice given to him to that effect.
The deposits of the unsuccessful tenderers shall be returned to them immediately after notice will have been given to the party whose tender will have been accepted.
Any notarial fees will have to be paid by the Contractor.
The undersigned retains the power of accepting or rejecting all or any of the tenders received.
C. RAPINET,
Acting Auditor-General and
Director of Contracts.
Office of the Auditor-General and Director of Contracts, Valletta, Oct. 7, 1880.

TAR PLANT.

SPECIFICATIONS and Tenders are in-vited for the Supplying and Erecting of APPARATUS complete for a small TAR-WORKS.
Particulars on application.
The Company do not bind themselves to accept the lowest or any tender.
JOHN J. JERVIS, Manager.
Swindon New Gas Company, Limited.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Halstead Gas Com. pany, Limited, invite TENDERS for the Purchase of the Surplus TAR and LIQUOR produced at their Works from Jan. 1, 1881, to Jan. 1, 1882. Quantity of coal carbonized about 1000 tons.
Further information may be obtained on application to the Manager.
C. B. BROWN, Manager.

TO TAR AND AMMONIA DISTILLERS, &c.

THE Directors of the Redhill Gas Com-pany are prepared to receive TENDERS for the Surplus TAR and AMMONIACAL LIQUOR produced at their Works for One, Two, or Three years, from Jan. 1, 1881, or such other terms as may be agreed upon.
Particulars respecting quantity, &c., may be had on application to the Manager, at the Works, Redhill, Surrey.
Tenders to be delivered or sent, so as to be at the Gas-Works not later than Tuesday, the 30th inst., and endorsed "Tender for Surplus Tar and Ammoniacal Liquor."
By order of the Board,
C. HEAD, Manager and Secretary.
Gas Office, Frighton Road, Redhill, Surrey, Nov. 5, 1880.

MR. W. H ALLEN begs to advise the public that he has resigned the appointment he has held for the past twelve years, as Manager to the firm of Messrs. Gwynne and Co., the Hydraulic and Mechanical Engineers, of Essex Street Works, Victoria Embankment, London; and has taken the Engineering Works lately occupied by Messrs. Merryweather and Sons, in York Street, Lambeth (who have removed to larger premises at Greenwich), where he has commenced business as a manufacturer of Special Machinery of the best London make.
He has taken into partnership Mr. Richard Wright, who occupied a position under him for many years at the above works.
The style of the firm will be W. H. Allen and Co.
York Street Works, Lambeth, S.E., Nov. 1, 1880.

JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

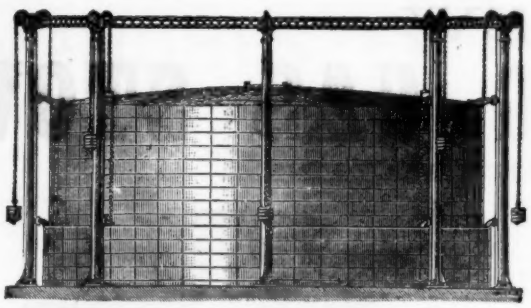
AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

Now ready, Second Edition, price 7s., by post 7s. 3d., the

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, M.I.C.E.

Orders to be sent to
WALTER KING,
11, BOLT COURT, FLEET STREET, LONDON, E.C.



J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

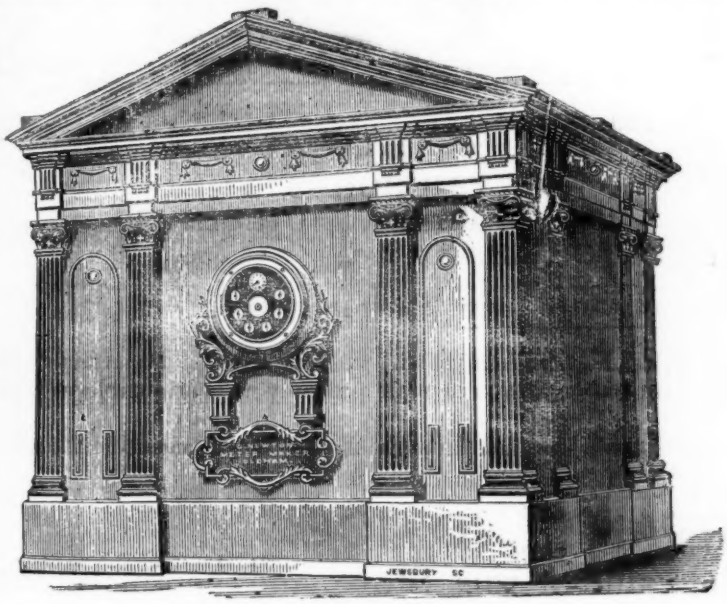
ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM,



MANUFACTURER OF

SQUARE STATION-METERS, with PLANED JOINTS;

ROUND STATION-METERS, WITH CAST-IRON STANDS;

WET AND DRY CONSUMERS GAS-METERS, GOVERNORS, &c.

MR. CORBET WOODALL, C.E.,

Has Removed his Office to

PALACE CHAMBERS, BRIDGE STREET,

WESTMINSTER, S.W.

NOTICE OF REMOVAL.

THE OWNERS OF

THE

BIRTLEY IRON-WORKS

AND

PELAW MAIN COLLIERIES

Have REMOVED their London OFFICES from No. 101, Cannon Street, to No. 46, Cannon Street.

Their Warehouse for Gas and Water Pipes and other Castings is at Scott's Wharf, Bankside, SOUTHWARK.

GAS-WORKS FOR SALE.

TO BE SOLD by PUBLIC AUCTION, at the Mart, Rosemary Street, Belfast, on FRIDAY, the 12th of November, at One o'clock,

THE Gas-Works of Tandragee, an improving MARKET and MANUFACTURING Town in County Armagh, and within one mile and a half of CANAL and RAILWAY service from the seaports o BELFAST and NEWRY, accessible within an HOUR.

The Concern comprises all the Ground, Buildings, and Plant requisite for present make and further extension, including Dwelling-house and Shop at street frontage, Retort-House with four benches of Retorts, Coal-Stores, Condensers, Purifiers, Station-Meter, Gasometer, Governors, Tar-Well, Pump, Street-Mains, Consumers Meters, &c., &c.

The present GAS-RENTAL of £700 per annum can be largely increased.

The premises are held under FEE-FARM GRANT at an annual rent of £10.

Nine perches of adjoining Land have been added to the Premises, and are held for lives renewable for ever, FREE OF RENT.

If so desired, a portion of the purchase-money may remain as a first charge on the Property.

Intending Purchasers can make inspection any day previous to sale, and, for further particulars, may apply to

ALEXANDER MILNE & Co., 11, CHICHESTER ST.

And for Title to

R. A. MACRORY, Solicitor, ULSTER CHAMBERS.

HUGH C. CLARKE & SON, Auctioneers, Rosemary Street, BELFAST.

Oct. 15, 1880.

GARSIDE'S IMPROVED MAIN DRILLING CLIP.

No. 1 takes from 2-in. to 6-in. Mains.

No. 2 takes from 6-in. to 12-in. Mains.

GARSIDE'S REGISTERED TUBE-VICE takes ¾ brass to a 2-in. Socket.

May be had direct from the maker, SAMUEL GARSIDE, Gatefield Iron-Works, ASHTON-UNDER-LYNE.

Price 28s. each, handsomely bound in Morocco, cloth sides, gilt edged and lettered.

THE FIRST AND SECOND VOLUMES

OF

KING'S TREATISE

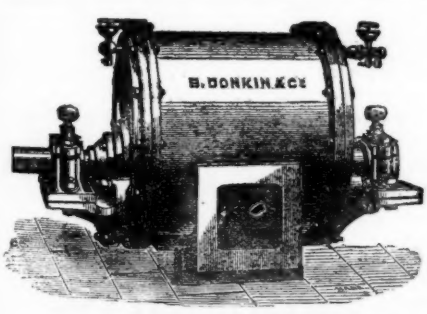
On the Science and Practice of the Manufacture and Distribution of

COAL GAS.

Edited by THOS. NEWBIGGING, C.E., M.Inst.C.E. and W. T. FEWTRELL, F.C.S.

Orders received by

WALTER KING, 11, Bolt Court, Fleet Street, London, E.C.



NEW PATENT GAS-EXHAUSTERS.

[J. BEALE'S.]

MESSRS. B. DONKIN & Co. possess the sole right to manufacture J. Beale's Exhausters under his new patent.

MADE WITH TWO OUTSIDE BEARINGS AND LATEST IMPROVEMENTS.

ALSO MANUFACTURERS OF

IMPROVED GAS AND WATER VALVES, STEAM-ENGINES, &c., &c.

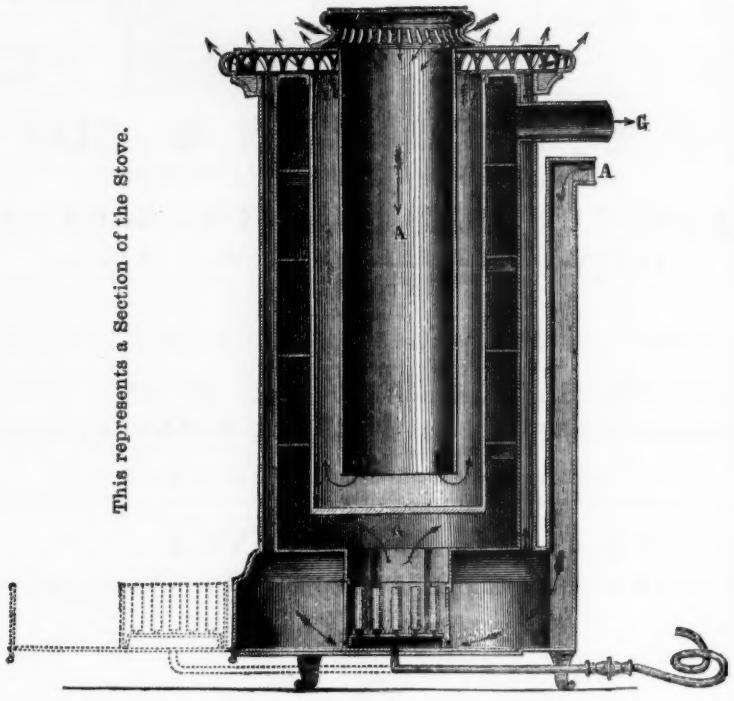
B. DONKIN & Co., BERMONDSEY, LONDON.

NEW

VENTILATING GAS STOVE.

DR. ADAMS'S PATENT.

No. B 780.



FOR HEATING

APARTMENTS, OFFICES, HALLS, | **BEDROOMS, CHURCHES, PUBLIC BUILDINGS,**

CONSERVATORIES, &c., &c.

For Full Description, see Prospectus.

Speaking of this Stove, Dr. Wallace, F.R.S.E., Gas Analyst for Glasgow, says: "Dr. Adams's Gas Stove is the best I have seen, and approaches as near to perfection probably as is attainable in actual practice."

Professor Dittmar says: "Dr. Adams's Stove is founded throughout upon sound scientific thought."

IMPORTANT NOTICE.

Being convinced of the value of this Stove, and having proved by experiment that the thermal results are far in advance of those yielded by any other stove, we have decided by special arrangement with the Patentee, and in order to bring it within the reach of all, to reduce the prices as follows:—

No. B 780 Size.		No. B 781 Size.	
Consumption of gas per hour	8 cubic feet.	Consumption of gas per hour	12 cubic feet.
Cubic feet of air warmed per hour	2200 „	Cubic feet of air warmed per hour	3500 „
Temperature of air warmed above initial heat..	180° Fahr.	Temperature of air warmed above initial heat	180° Fahr.
Price £4 4s.		Price £6 6s.	

A LIBERAL DISCOUNT TO GAS MANAGERS.

JOHN WRIGHT & CO.,

ESSEX WORKS, BROAD STREET, BIRMINGHAM.

London Warehouses—155a, UPPER THAMES STREET, and 1, LITTLE BUSH LANE, E.C.

MANCHESTER AND GLASGOW
GAS APPARATUS, &c., EXHIBITIONS.

W. & B. COWAN have received the following awards:

MANCHESTER INDUSTRIAL EXHIBITION,

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Silver Medal for WARNER & COWAN'S Wet Meters.

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GLASGOW, 1880.

SPECIAL HIGHEST AWARD,

FOR

Accuracy of Registration and Excellence of Workmanship of WARNER & COWAN'S Wet Meters.

HIGHEST AWARD FOR DRY METERS.

HIGHEST AWARD

For 10-feet Testing Gasholder according to Government Standard.

W. & B. COWAN,

(ESTABLISHED 1827,)

WET & DRY GAS-METER MANUFACTURERS,

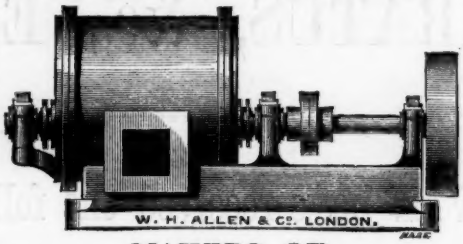
CHURCH STREET, MILLBANK STREET, **LONDON, S.W.**	DUTTON STREET, NEW BRIDGE STREET, **MANCHESTER.**	BUCCLEUCH ST. WORKS, **EDINBURGH.**

W. H. ALLEN & CO.,

MECHANICAL ENGINEERS,

YORK STREET WORKS, LAMBETH, LONDON, S.E.

These Exhausters are made with the latest improvements, and are further fitted with a new segment of annealed cast iron, so contrived that the gas is



not allowed to expand into the Drum, as in the old machine, and a considerable saving is thereby effected.

MAKERS OF

GAS EXHAUSTING AND PUMPING MACHINERY.

IMPROVED BEALE'S PATENT.

LIVESEY'S PATENT WASHER.

This apparatus effects the most intimate contact between the liquor with which it is supplied and the gas passing through it, resulting in the complete removal of all particles of tar, increasing the ammonia strength of the scrubber and condenser liquor, and removing a large proportion of other impurities—notably, carbonic acid. The Washer is intended to work in conjunction with a scrubber. It occupies little space, and is inexpensive. It does not become clogged with tar or corroded by the action of the liquor or gases, it gives three inches of pressure, and only needs a supply of liquor to keep it in regular action without any further attention. It has been in constant successful use for five years, and is now in operation in upwards of fifty places.

Prices, fitted and fixed complete, exclusive of Valves and Connections; all foundations and unskilled labour required in erection to be provided by the Gas Company:—

Quantities to pass in cubic feet per 24 hours	100,000	250,000	500,000	750,000	1 million	1½ million	2 million	3 million	4 million
Price each	£30	£50	£70	£95	£120	£165	£200	£280	£360

For further Particulars apply to

Messrs. DEMPSTER AND SONS, ELLAND, HALIFAX, for the North;
Messrs. BAILEY, PEGG, AND CO., Bankside, LONDON, S.E., for the South;
Messrs. WILLEY AND CO., Commercial Road, EXETER, for West of England and South Wales;
Or to the PATENTEE, 589, OLD KENT ROAD, LONDON, S.E.

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SILICA FIRE-BRICK CO.,

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Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

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Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

MOBBERLEY & PERRY,

FIRE-CLAY AND BRICK WORKS,

STOURBRIDGE.

Manufacturers of FIRE-CLAY GAS RETORTS, Lumps, Tiles, Best Fire-Bricks, and every requisite for Gas-Works.

Large Stock of all Sizes of Retorts on Hand.

J. & H. ROBUS,

BUILDERS AND CONTRACTORS

FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,

RETORT-SETTING—A SPÉCIALITÉ.

ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.

ESTIMATES GIVEN FOR MAIN-LAYING.

N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.

Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

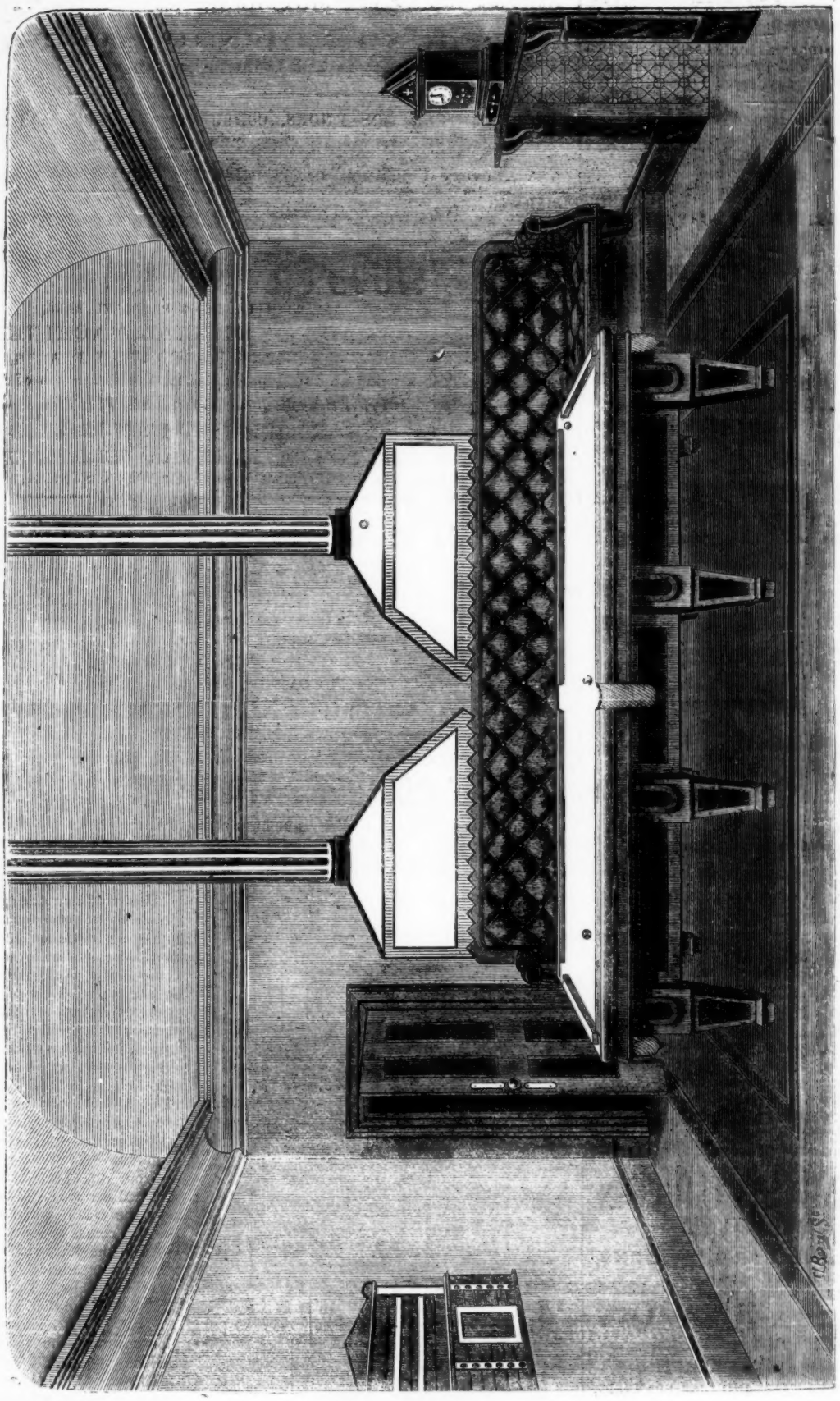
LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

THE LATEST NOVELTY

FOR THE EFFECTIVE LIGHTING of BILLIARD TABLES.

BILLIARD TABLE LIGHTING BY WILLIAM SUGG'S PATENT SELF-VENTILATING SYSTEM AND BURNERS OF HIGH ILLUMINATING POWER,



Securing a Total Absence of Heat and Shadow, with a Steady and Brilliantly White Light, and Small Consumption of Gas.

N.B.—All products of combustion are carried away into the open air, and cannot, therefore, mix with and vitiate the atmosphere of the room.

One of the above has been fitted up in the Billiard-Room of the Raleigh Club, Regent Street, and the Secretary states that the Table is the best lighted he has ever seen.

APPLY TO

WILLIAM SUGG,

VINCENT WORKS, WESTMINSTER, & GRAND HOTEL BUILDINGS, CHARING CROSS.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
FINSBURY CIRCUS, LONDON.

ESTABLISHED IN 1860.

BENJAMIN CARPENTER,
THE ORIGINAL MANUFACTURER OF THE IMPROVED
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1¼ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

GEORGE'S
Patent Gas Calorigen,
A STOVE FOR
WARMING AND VENTILATING.
RECOMMENDED BY DR. RICHARDSON.

MANUFACTURERS:
J. F. FARWIG & CO.,
36, QUEEN STREET, CANNON ST., LONDON.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

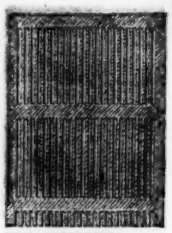
Gold Medal Awarded, Paris Exhibition, 1878.

THOMAS TURTON AND SONS,
SHEAF AND SPRING WORKS,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS,
STEEL OF ALL DESCRIPTIONS,
SCREW STOCKS, TAPS, AND DIES, SPANNERS,
RATCHET BRACES, LIFTING-JACKS,
ANVILS, VICES,
AND ENGINEERS TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.

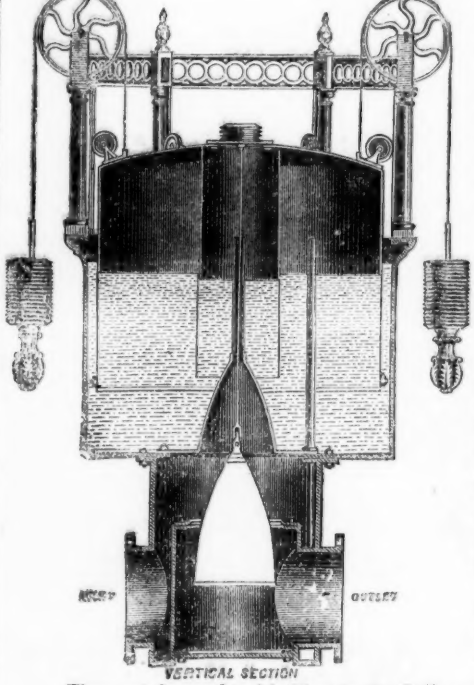
STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

R. DEMPSTER AND SON'S

WOOD SIEVES FOR PURIFIERS,
WITH TAPER OR PARALLEL BARS,
MADE BY SPECIAL MACHINERY.
SCRUBBERS FILLED WITH BOARDS,
On our approved principle, for the extraction of Ammonia.
Prices on application. References to First-Class Engineers.
ROSE MOUNT IRON-WORKS,
ELLAND, NEAR HALIFAX.
LONDON OFFICES: 2, SUFFOLK LANE, CANNON STREET, E.C.

J. & J. BRADDOCK,
GLOBE METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY CONSUMERS GAS-METERS,
OF THE HIGHEST EXCELLENCE ONLY;
ROUND STATION-METERS,
ON CAST-IRON STANDS;
SQUARE STATION-METERS,
WITH PLANED JOINTS.

Messrs. BRADDOCK beg to submit to Gas Engineers their
PATENT COMPENSATING GAS GOVERNOR,
Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 30-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

The understated declaration with which we introduced our apparatus when the Argand system was in the full tide of its fame, has been fully borne out by general experience, namely—

"THE FLAT-FLAME IS THE ONLY PRACTICABLE SYSTEM FOR STREET LIGHTING; and, 'in actual use,' yields as much light with Common Gas, and more with Cannel Gas, than any Argand System."

CHARLES HUNT, Esq. (President of the British Association of Gas Managers), in his Inaugural Address to the members at their annual meeting, held in London, June, 1880, said: "Rivalry has stimulated into being, for outdoor purposes mainly, Burners of large power, that have fully maintained the superiority of coal gas over the electric light. To Mr. Bray our thanks are due for his development of the FLAT-FLAME BURNER into a lighting medium of a very high order, *and for his vindication of its claims to practical consideration.*"

The above declaration was received with marked applause by the crowded meeting.

BIRMINGHAM LAMP TESTS.

AFTER the most exhaustive series of experiments, extending over more than twelve months, with the most extensive assortment of Burners and Lanterns of large lighting power ever brought together, the Birmingham Authorities have

ADOPTED BRAY'S SYSTEM

for their Street-Lighting Improvements, for which purpose Sixty-Five 100-candles power Lanterns of medium lighting power are being fixed.

The apparatus used in the above tests were all of our usual medium lighting power class, and the tests showed that we sacrifice a considerable amount of lighting power for general efficiency. The tests further showed that our 80*-candles* HIGHEST *lighting power burner yielded* 3·51 *candles per foot of gas—the quality being* 16·75 *candles* (3·35 *per foot*) *by the standard—which was a higher result than that yielded by any other flat-flame burner, though copies of our Slit-Unions, enlarged and improved by us Jan.,* 1879, *were used by our competitor; and higher than the* 80*-candles power Argands.*

NOTE.—The above is the most conclusive answer to the ever-changing and misleading statements which are being made by our competitor, with the object of taking from us the honours we have secured in open contest.

Extract from the *Leeds Mercury*, April 1, 1880.

At the meeting of the Leeds Town Council, March 31, Alderman Gaunt moved that the Council approve of the acceptance by the Corporate Property Committee of the tender of Messrs. Geo. Bray and Co. for the supply of 21 new lamps, to be placed upon the pillars round the Town Hall. The Committee had tested Sugg's and other lamps, and found Messrs. Bray's the best. It was intended to have two 200-candles power and two 100-candles power, and 17 round the hall of 80-candles power. Mr. Lynd, in seconding the motion, said that he had had an opportunity of seeing different lamps tested at Birmingham, and he was in favour of Messrs. Bray's.

Extract from the *Daily Free Press*, Aberdeen, Jan. 1, 1880.

Judging of the merits of the lights as they appeared last night, on-lookers seemed to be generally of opinion that between Sugg's patent and Bray's larger light at the corner of Union Buildings, Castle Street, there was no perceptible difference in the illuminating power. When the vital question of gas consumption is taken into account, it is found that in the Castle Street lamps there is a marked difference in the quantity of gas consumed, for while 30 feet of gas are hourly burned in Sugg's Patent Lamp, only 20 feet are used by Bray's Lamp during the same period.

[The above Lamps have Meters attached.]

BRAY'S LANTERNS have been adopted by the Vestry of St. George, Hanover Square, London, for all the crossings and refuges of that important district, after a direct competition with the Argand system of lighting.

Also more than 50 Towns and Vestries have adopted them, after a similar competition in most cases; and many private users. In all cases they are a pronounced success.

GEORGE BRAY & CO., BLACKMAN LANE, LEEDS.

June, 1880.

THE

MANN & WALKERS' PATENT SCRUBBER

Extensive use.

The successful and extensive use of the Mann and Walkers' Patent Scrubber in all parts of the world has demonstrated their advantages, and entitled them to be received with credit and confidence. The number of them in use is about twenty times that of any other known means of purifying gas from ammonia.

Small quantity of Water required.

By a very small quantity of clean water (not more than 5 or 6 gallons per ton of coals carbonized) the whole of the Ammonia contained in the Gas is completely absorbed; the Gas, after only once passing through, issuing from the Scrubber outlet completely purified from Ammonia. The Scrubber gives no appreciable back pressure.

Residual Product obtained.

The Residual Product—namely, the Ammoniacal Liquor—is obtained from 20 to 30 ounces commercial strength, which enables it, after being mixed with the weaker Liquor from the hydraulic main and condensers, to be sold to the Manufacturing Chemists, or converted into Sulphate, at the degree of strength found most profitable to the Gas Company.

Illuminating power increased.

The Scrubber is a Saturator, and the Gas being soaked in this strong solution of Ammonia in the lower columns of the Scrubber, is purified from a large amount of Carbonic Acid, and its Illuminating Power is thereby increased.

Small amount of power required.

The friction is so little, and the motion so slow, that the power necessary to work the Scrubber is almost inappreciable. A small gas-engine will work a pair of Scrubbers, purifying 2 million cubic feet of gas per day.

Beckton Gas-Works.

There are thirty of these Patent Scrubbers in the Beckton Gas-Works, equal to purifying 30 million cubic feet per day, and the total amount of engine power necessary to work the whole 30 is not equal to that given out by one 10-horse engine.

Reserve purifying power contained.

There is also a most important advantage arising from the height of these Scrubbers, in the reserve force contained in them. In the event of any stoppage, the mass of soaked and wetted material would continue the purification for hours, even if the supply of water and working were stopped from any cause.

Internal Materials not changed.

The changing of the soaking materials in these Scrubbers is very seldom required; they are well known to remain in action for seven years without being emptied.

Guarantee.

They are in all cases erected under guarantees; they easily fulfil the stipulations of any Act of Parliament, and the chemical restrictions of the Board of Trade; and in cost they are much less to a Gas Company than any other known means of purifying Gas from Ammonia.

C. & W. WALKER.

8, *Finsbury Circus, London, E.C.*

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

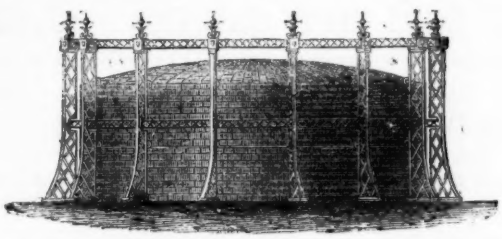
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

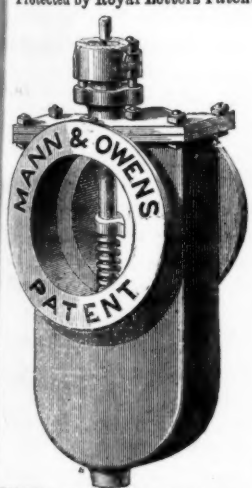
HYDRAULIC, GAS, AND GENERAL ENGINEERS,

WHITEFRIARS STREET, LONDON, E.C.

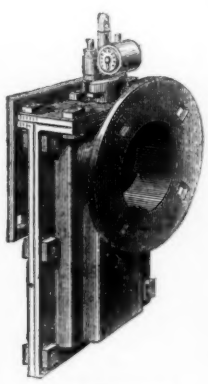
SOLE MANUFACTURERS OF

MANN & OWENS PATENT SCREW AND CAM, ALSO IMPROVED FULL-WAY RACK AND PINION GAS-VALVES.

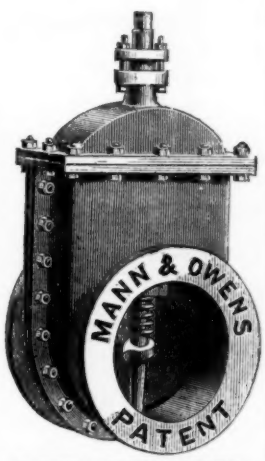
Protected by Royal Letters Patent in England, France, Belgium, & the United States of America.



VALVE to OPEN DOWNWARDS.



BRIDGE-VALVE for Regulating the Seal of Hydraulic Mains.



VALVE to OPEN UPWARDS.

The SPECIAL ADVANTAGES of MANN AND OWENS' PATENT VALVE are as follows:—

1. Its non-liability to become set fast through varying temperature or from the deposit from crude gas. 2. It is made absolutely gas-tight by the simple action of a screw and cam. 3. Inconvenience through the breakage of springs or wedges setting fast cannot arise. 4. The face of the Valve is scraped and cleaned of any solid matter at each operation of opening or closing.

The Valve can be had to work either in a Vertical or Horizontal position.

Every Valve is carefully tested under pressure, and warranted perfectly sound and gas-tight.

INSTRUCTIONS FOR ORDERING.

State whether required for above or below ground, if Double Flange or Socket and Spigot Valves are wanted, or with loose Flanged Socket and Spigot pieces.

The Prices include Indicators to show extent to which Valve is open.

Also makers of PILLAR-VALVES, SELF-ACTING BYE-PASS VALVES, OUTSIDE RACK AND PINION VALVES, HYDRAULIC-MAIN VALVES, DISC-VALVES, &c.

Every description of Pumping Apparatus, Hydraulic Lifts, &c., suitable for use in Gas-Works, made to order.

PRICES, SIZES, AND FULL PARTICULARS, WITH COMPLETE ILLUSTRATED CATALOGUE, FURNISHED ON APPLICATION.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

MECHANICAL AND CONSULTING GAS ENGINEER,

NORWOOD, NORTHENDEN ROAD,

SALE, NEAR MANCHESTER.

ALFRED LASS,

Fellow of the Institute of Chartered Accountants,

SPECIAL ACCOUNTANT FOR GAS AND WATER UNDERTAKINGS,

30, GRACECHURCH STREET, LONDON.

Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

MR. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

THOMAS PROUD,

BROOKFIELD WORKS,

103, ICKNIELD ST., BIRMINGHAM,

MANUFACTURER OF

WOOD GRIDS

FOR

PURIFIERS AND SCRUBBERS,

AND

GENERAL STEEL AND IRON TOOLS AND MATERIAL USED IN GAS-WORKS.

BOX'S PATENT STREET GAS-LAMP

Has the following good qualities:—

1. No putty or other material is required for glazing. Thus there is no hacking out of old putty on removal of the glass, with the *consequent damage* to the lamp frames. 2. No liability to breakage by unequal expansion of the glass caused by changes of temperature. 3. Any inexperienced workman can glaze the lamp in a few minutes. 4. The system of glazing can be applied to any existing lamp at a trifling cost. 5. It is cheap, strong, and durable. 6. The glass can be easily removed so that the frames can be thoroughly painted inside and out.

The lamp may be supplied fitted with clear opal or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing lamps to this system can be supplied at moderate prices and a small charge for royalty. Licences granted on the most reasonable terms. For further particulars apply to the Patentee,

W. W. BOX,

Gas-Works, Crayford, Kent.

RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

TREES BOGHEAD,

SHOTTS BOGHEAD,

And all the first-class Scotch Cannels.

Prices and Analyses on application.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analysed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67-*candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·88.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON. London Agent: MR. F. J. LEE SMITH, Bromley, KENT.

HUCKNALL TORKARD CANNEL.

The HUCKNALL COLLIERY COMPANY can offer a Cannel producing a considerable quantity of Gas of good quality.

For analysis and price apply to the Company at their

HUCKNALL TORKARD COLLIERIES,

NEAR NOTTINGHAM.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

LIMITED,

MANUFACTURERS OF

PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES,

BENDS, JUNCTIONS, &c.

Fire-Bricks, Tiles, Blocks, and Chimney-Tops.

IMPORTANT to GAS COMPANIES.

ENORMOUS SAVING.

JOHN ABBOT & CO., LIMITED,

OF SUFFOLK LANE, LONDON, AND GATESHEAD,

Manufacture and Erect

HYDRAULIC CRANES

For Discharging Coal Barges;

WAGGON HOISTS

For Lifting Coals to Retort-House Stageway:

CAPSTANS

For Moving Trucks about the Yard,

And Apparatus for Lifting PURIFIER COVERS.

Examples to be seen at Beckton, Hull, &c., &c.

WILLIAM MACLEOD & CO.,

30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.

Sole Agents in Scotland for the Torbay Paint Co.

Prices on application.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES.

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHER SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, will be sent, post free, on receipt of 4s. in stamps To be had of the AUTHOR; or at the Office of the "JOURNAL OF GAS LIGHTING."

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

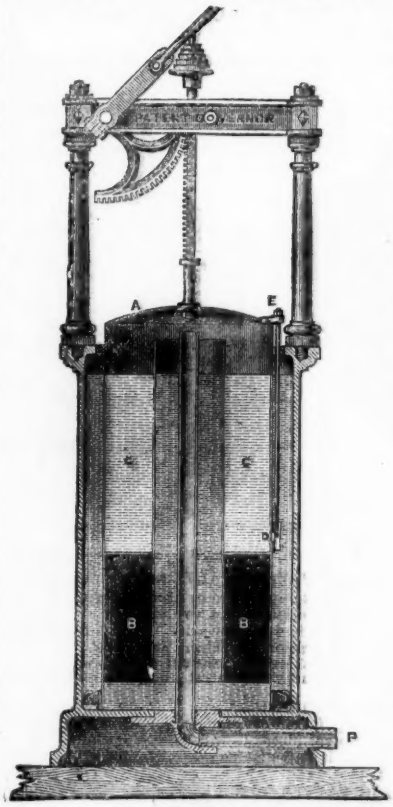
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

GEORGE WALLER & CO.,

GAS AND HYDRAULIC ENGINEERS,

Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



This is the most efficient and perfect Governor yet made to control and regulate the speed of Engines and Exhausters according to the varying make of gas, and maintain a steady gauge, whether working level or with six inches of seal.

It is the only Governor that will effectually control Condensing and Compound Engines, especially when the Exhauster is on light work, and the Engine is large.

During the drawing and charging of Retorts, the Engine requires no attention—a matter of great importance in small works.

Descriptive Circular sent on application.

They are in use at

BECKTON,
HAMPTON WICK,
DUKINFIELD,
HARTLEPOOL,
NEWCASTLE-ON-TYNE,
RAMSGATE,
SUTTON,

and about 30 other works.

G. W. and Co. make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

See also advertisement, page 739.

PHŒNIX ENGINEERING WORKS,

Holland Street and Bear Gardens, Southwark, S.E.

THE
LANCASHIRE GAS-METER COMPANY, LIMITED,
FALCON STREET, ASHTON ROAD,
OLDHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
STATION-METERS, GOVERNORS,
LAMP GOVERNORS AND TAPS, PRESSURE-GAUGES, MAIN THERMOMETERS
ETC., ETC.

THE FARNLEY IRON COMPANY, LIMITED,
FARNLEY, near LEEDS,
MANUFACTURERS OF
FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,
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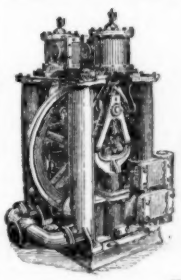
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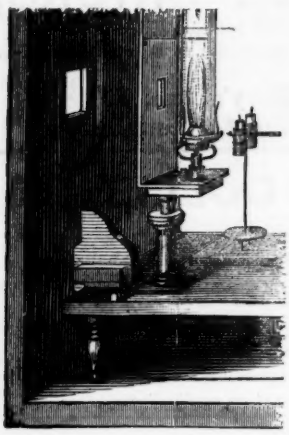

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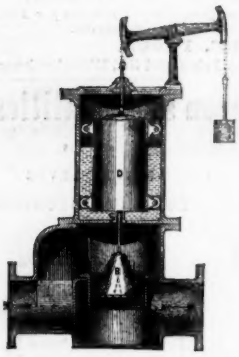

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